Commentaries on diseases of the stomach and bowels of children / by Robley Dunglison.

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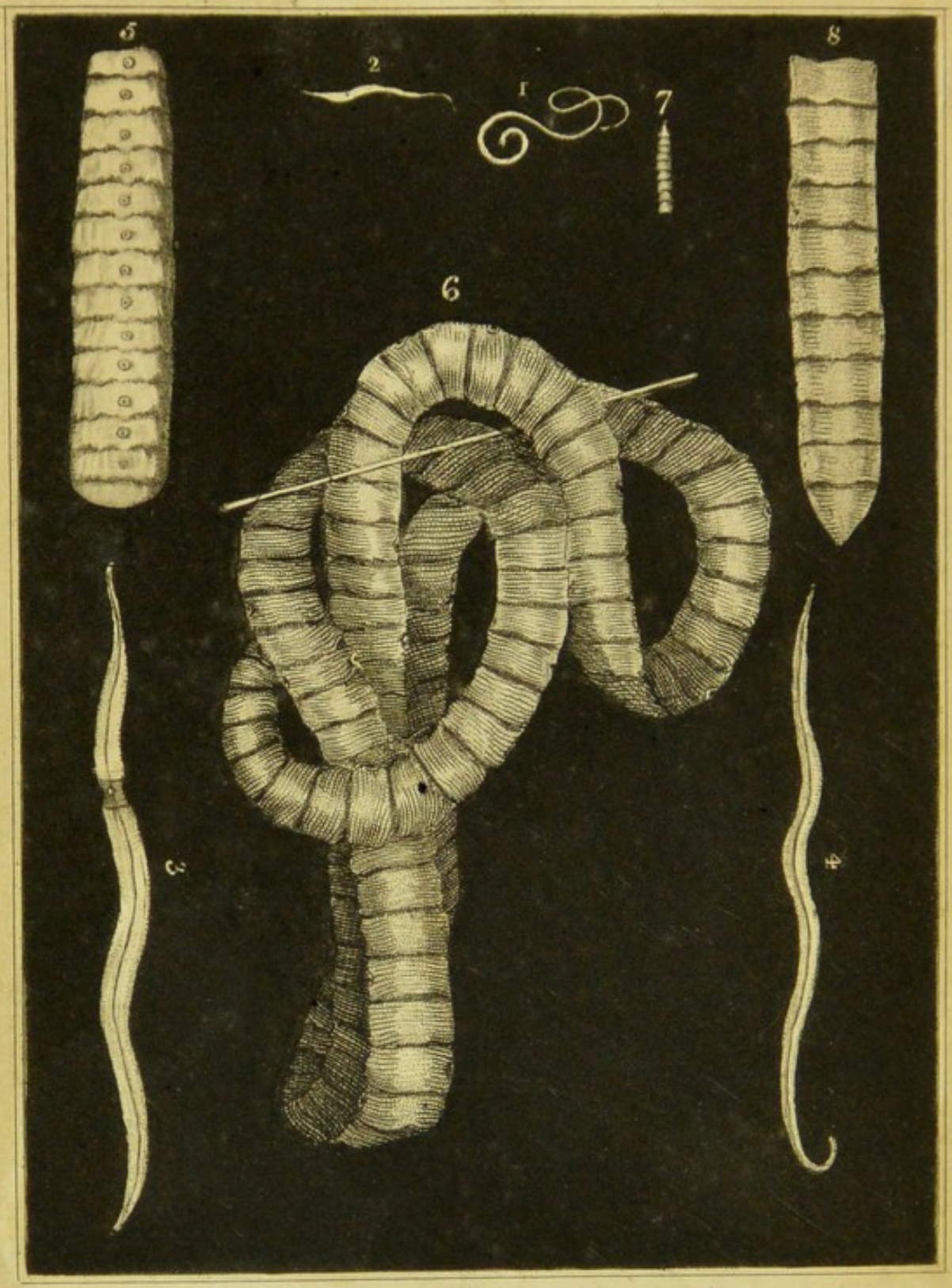

INTESTINAL WORMS.

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COMMENTARIES

ON

DISEASES

OF THE

STOMACH AND BOWELS

OF

CHILDREN.

By ROBLEY DUNGLISON, M.D.

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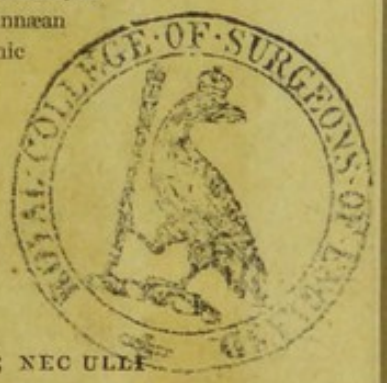

MULTUM ADHUC RESTAT OPERIS, MULTUMQUE RESTABIT; NEC ULLI NATO POST MILLE SECULA PRÆCLUDETUR OCCASIO, ALIQUID ADHUC ADJICIENDI.—*Seneca.*

LONDON:

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G. B. WHITTAKER, AVE-MARIA LANE.

1824.

ERRATUM.

At page 15 note 2 *dele* Tæniæ vel.

PREFATORY OBSERVATIONS.

"Minimè dubium est, ægritudinem puerilium curationem exquisitam perindè omnibus exoptandam esse, ac aliud quicquam quod in arte medicâ hactenùs desiderari videatur. Nec modò viri opulenti, qui terrarum et latifundiorum amplissimorum hæredes aut exoptant, aut sospites conservare volunt, in hâc re plurimum ponunt, verùm et parentes universi στοργῇ ferè invincibili erga sobolem suam exardescunt, atque in tutelam eorum tanquàm propriam suspirant. Quamobrem si facem utut exiguam mihi detur accendere, quâ alii egregiis animi dotibus ornati opus hoc tàm imperfectum limato suo ingenio perpoliant, ac magis absolutum reddant, incœpti neutiquàm pœnitebit, et boni id ego consulam." HARRIS, *de Morbis acutis Infantum*, p. 3.

THE reflections suggested by Harris in the above quotation are such as have possessed the Author of the following pages. It has been a general complaint that, whilst the diseases of adults have monopolized the attention of professional writers, those of childhood—a period of the greatest disease and mortality, and during which, many individuals who, if permitted to live, might have proved most useful and ornamental members of society, are prematurely snatched from existence—have been comparatively neglected.

This has too much arisen from an idea that the diseases of young children cannot be satisfactorily investigated, from their not being able to describe their complaints, and that, consequently, the practice of the physician is generally empirical. This is not, however, correct. To the experienced eye, the deviations from health are readily recognized. The state of the skin, secretions, excretions, tongue, eye, breath, fatness or leanness, gestures, cries, &c. &c. will sufficiently indicate the difference between the healthy and diseased condition.

M. Jadelot, Physician to the *Hôpital des Enfans trouvés,* an individual who has, perhaps, had greater opportunities than any other for observing the diseases of childhood, has lately been the means of communicating to the world his experience of what he terms "*La Séméiologie physiognomonique*," in the study of the diseases of children—a mode of discrimination of which M. de Salle, the author of the work in which it has appeared, has so high an opinion, that

he conceives their diseases will be recognized with such facility, that the possessor of the most mediocre talent may know and cure them as readily as he who is more highly gifted. "Par elle, le talent médiocre pourra un jour observer et guérir avec autant de promptitude et de sureté que le génie médical lui-même. Par elle, notre art sera aussi lavé quelque jour du reproche qu'on lui adresse depuis long-tems, et malheureusement avec trop de raison, de ne faire pour les enfans que la médecine hippiatrique*."

From the meagre and imperfect details furnished by M. de Salle, the reader may be enabled to form some idea of the doctrine professed by M. Jadelot.

Three principal traits, according to that gentleman, are observable on the countenances of young children; these are nearly parallel, and uniformly proceed from the

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* *Traité des Maladies des Enfans de* Michael Underwood, &c. &c. p. 36 et seq.

middle towards the lateral and inferior part of the face.

The *first* commences at the greater angle of the eye, and is lost a little below the projection formed by the cheek-bone. This is called the *oculo-zygomatic.*

The *second* begins at the upper part of the ala nasi, and embraces, in a semi-circle, more or less perfect, the outer line of the orbicularis oris. It is not uncommon to observe, towards the middle of the cheek, and forming a species of tangent with the trait just described, another, which, in certain faces, constitutes the dimple of the cheeks. The alterations of these two traits are referrible to similar affections. The one he terms *nasal*, the other *genal.*

The *last* begins at the angle of the lips, and is lost on the lower portion of the face; this is called the *labial.* It seldom forms a deep line, being modified by the changes which the neighbouring parts undergo. The others, on the contrary, are more or less deeply marked according as

the diseases to which they are referrible are more or less intense or chronic.

The *first* mentioned trait is the index of disorders of the cerebro-nervous system ; the *second*, and its accessary, signalize those of the digestive passages and of the abdominal viscera ; the *third*, is the concomitant of diseases of the heart and air passages.

Speaking generally, they are all the outward signs of lesions of the great splanchnic cavities.

The *oculo-zygomatic* trait is strongly marked in all those diseases whose primary seat is in the brain or nerves. It is likewise observable whenever these organs actively participate in affections which were in the first instance foreign to them : but at such times a coincidence of some other facial line is found, which indicates the complication Thus, for instance, it is said, that the moment at which inflammation of the lungs, or catarrh, becomes converted into neurosis, or at which a common cough becomes that of pertussis, is marked upon the child's coun-

tenance by the *oculo-zygomatic* trait. The same circumstance occurs when any disorder, primarily seated in the intestines, affects the brain ; as, for example, when the presence of worms or of chronic inflammation in the digestive tube, occasions epilepsy, convulsions, or hydrocephalus.

At the onset of all severe diseases, according to M. de Salle, the inspection of the child's countenance may serve as a useful guide to the physician in discovering the organ affected. The presence or absence of the *oculo-zygomatic* trait during the existence of the nervous symptoms, which early exhibit themselves, will teach him whether the cerebro-nervous system be primarily affected, or if its supervention be merely the result of sympathy.

It has been already remarked, that the *nasal* trait is indicative of affections of the abdomen. Care is said to be required not to confound this trait with a morbid sign—a line which sometimes exists in the most healthy infants. When the cheeks are very

fat, they constitute a projection which forms a trait between them, the ala nasi, and the contour of the lips; but it is said to be easy to distinguish whether the *nasal* line depends upon a diseased condition. In the latter case, the cheek is rather depressed than prominent, and the muscles of the face are in a state of almost permanent contraction. Lastly, it is equally marked when the emaciation is very great, as the absorption of the adipous and cellular tissue occasions the projection of the edges of the muscular fasciæ, between which it is situated.

Notwithstanding this double chance of confusion, it is said that a long experience is not required for recognizing the *nasal* trait when truly morbid. M. de Salle asserts, that at a single glance he has, in several cases, pronounced children to be labouring under different abdominal affections, and especially dysentery; and he has fancied that it more particularly indicated inflammation of the lower portion of the intestinal tube; dysentery, with abdominal

pain, being the disease in which this trait is most marked. When the stomach or intestines are equally affected, the *genal* trait becomes marked, the chin is prominent, the lips are applied against the teeth, the mouth seems enlarged, and the face presents the character which has been commonly designated by the term *pinched in (face grippée)*.

What has been observed relative to the mode in which inspection of the *oculo-zygomatic* trait may be rendered useful in the diagnosis of disease, is equally applicable to all the others. Thus the existence of that trait at the onset of a disease, will indicate an affection of the digestive tube; and towards the middle or termination of a nervous malady, it will point out its complication with an inflammatory or irregular action of the stomach and bowels.

"It seems to me," says M. de Salle, "that we may thus conceive the reason of the particular physiognomy observed in verminous affections: the weakness of sight; the fixed eye; the marked condition of the

naso-genal and *oculo-zygomatic* traits, are a consequence of the action exerted upon the intestines by worms, and of the active participation of the brain, through the sympathetic excitement. I have seen M. Jadelot, when attending a child labouring under cerebral disease, from a single inspection of the features, and from an unusually marked state of the *nasal* trait, pronounce the disease to consist in an accidental complication of verminous affections; and anthelminthics, given in consequence of this opinion, have occasioned the expulsion, in a few minutes, of several *Ascarides lumbricoides*.

"Lavater, who had doubtless studied physiognomy sufficiently to enable him to analyze the cases presented to his notice, has confined himself to observing that he had frequently suspected the existence of Tænia at the first view of the countenance of a patient labouring under it. He has not, however, explained in what the alteration which he had remarked in it consisted."

Although the above *exposé* of M. Jadelot's physiognomical system is, as was previously observed, very short and imperfect, the principal views of that physician may have been rendered intelligible to the reader. That they are somewhat too utopical, is evident. They can never lead to a discrimination between all those diseases which he has mentioned; as, for instance, between the annoyance occasioned by worms and any other source of irritation in the intestinal tube; but that an attentive examination of the anatomical expression of an infant's countenance will materially assist us in the diagnosis of the seat of a disease under which it may be labouring—for example, whether it be in the head or lower belly, no one who has paid any attention to the subject can doubt. There is a marked difference in the expression of the countenance which indicates the presence of violent pain in these two situations, even in the adult: lesser degrees of it are of course disregarded; and it is only in severe affec-

tions that physiognomy can be inservient to diagnosis: but in the infant which readily gives expression to any pain or uneasiness which it may experience, the countenance is an excellent medium of discrimination, and will frequently indicate, at the first glance, the seat of the derangement. The expression of the countenance, when suffering under pain, should consequently be always attended to; or, to use the words of an individual, whose attempts to localize as much as possible the various diseases have gained him much renown—the celebrated Broussais—practitioners should learn to recognize "*le cri des organes qui souffrent.*" A more detailed account of the "*Séméiologie physiognomonique*" is on the eve of appearing from the pen of its chief professor, M. Jadelot, which, we trust, may be accompanied by plates to elucidate his different positions. How comparatively imperfect would have been the excellent and accurate anatomical descriptions of Mr. Charles Bell in his "*Essay on the Ana-*

tomy of Expression," had they not been accompanied by the various beautiful graphic illustrations!

It may be proper to observe, that, in the course of the following work, the doses of the various medicines recommended for the treatment of the different diseases, have been in general omitted, in consequence of the work being intended for the professional reader, whose own judgment will fill up the *hiatus.*

At a future period, it is the intention of the Author to resume the consideration of some other of those diseases which are incidental to children; not under the arrogant expectation of being able to communicate much important information from his own stores, but in accordance with the motto at the head of these prefatory observations: "facem exiguam accendere, quâ alii egregiis animi dotibus ornati opus imperfectum limato suo ingenio perpoliant."

London,
September 15, 1824.

COMMENTARIES,

&c. &c.

CHAPTER I.

OF INTESTINAL WORMS.

Whilst in this country the medical and physical history of the different varieties of *Entozoa* has been almost wholly neglected, the continental naturalists have been occupied in perfecting this interesting department of science, and the labours of Brera, Rudolphi, and Bremser, have placed it upon a footing which it was far from having acquired before they undertook its investigation. At one period of medical history there was scarcely a disease, the origin of which was not referred to the influence of animalculæ in some form; and even at the present day, on the Continent, invermination is considered to have a

much more extensive agency in the production of disease than is allowed to it on this side of the Channel, and more than it appears to be fairly entitled to. Still, as in too many cases which present themselves in the annals of medical science, it is to be feared, we have left one extreme and passed into another equally fallacious, in ascribing too little morbific influence to the presence of these *entozoa*.

Varro, in his treatise *De Re Rusticâ*, attributes the deleterious effects of marshy exhalations to imperceptible insects, generated in these districts, being carried along by the wind and entering the lungs during respiration—an opinion which was also maintained by Columella, Palladius, and Vitruvius, and revived in 1598 by Mouflet. The itch, measles, contagious disorders in general, hydrophobia, syphilis, elephantiasis, toothache, and an infinity of different distempers, have likewise been ascribed to their agency; but most of these speculations have been found erroneous; and the belief in the verminous origin of these affections has gradually faded away. There is one species of worm, however, which has, of late years, been esteemed to have an important

sway in the causation of several diseases: viz. the hydatid. To this insect the pulmonary and other tubercles, the various tumours affecting the corporeal fabric, have been ascribed: but no clear evidence has as yet been adduced to render the notion indisputable.

The best systems for the classification of the worms which infest the human body, are those of Rudolphi and Bremser; from whose united labours Frank* has taken his arrangement. In his interesting work they are divided into five families: viz. 1, *Nematodea;* 2, *Acanthocephala;* 3, *Trematoda;* 4, *Cestoidea;* and 5, *Cystica.* All the species, however, which fall under these families, are not met with in the human body.

To the family of *Nematoidea*† belong those worms which have the outer skin more or less

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* *De Curandis Hominum Morbis Epitome.* Lib. vi, De retentionibus, p. 3.

† *Helminthi Nematodei.*—Corpore tereti, elastico, crassitie nunc æquali, nunc parte anteriore, vel posteriore, magis aut minus, pedetentim aut subito, acute aut obtuse deficiente, tractu intestinali hinc ore, illinc ano, terminato, individuis tam masculis quam fœmineis instructi. FRANK, p. 185.

furnished with muscular fibres; and, in general, transversely striated; containing also an abdominal cavity, in which there is a distinct intestinal canal proceeding from the mouth to the anus, and possessing distinct organs for both sexes. Blood-vessels cannot be distinguished in them, but they appear to have two nervous cords, proceeding from a ring which surrounds the mouth, and extending along the whole length of the body, at the internal surface of the integuments; one on one side, the other on the other. The intestine is generally straight, and somewhat wide; the œsophagus commonly thin; and, in some species, a comparatively capacious and strong stomach is observable. The internal organs of generation consist of very long vessels, containing seed or eggs, issuing at different places according to the genus*.

The only species of this family which have been hitherto observed in man, are the *Filaria medinensis*, or *Guinea worm*, the *Tricocephalus dispar*, the *Oxyuris vermicularis*, the *Ascaris lumbricoides*, the *Strongylus gigas*, and the *Ha-*

* *Règne Animal*, par le Baron Cuvier, tom. iv, p. 29.

mularia subcompressa; and of these, the *Tricocephalus dispar*, the *Oxyuris vermicularis*, the *Ascaris lumbricoides*, and the *Strongylus gigas*, have alone been found in the human intestines, and, consequently, alone come under notice in this place.

The *Tricocephali** in general have a cylindrical and elastic body, terminated anteriorly by a filiform appendix. The mouth is orbicular; the genital organ of the male simple, and enveloped in a sheath.

The *Tricocephalus dispar*† of Rudolphi, the *Trichuris*, *Trichuris vulgaris*, *Trichuris intestinalis*, *Ascaris Trichiuria*, *Tricocephalus hominis*, *Mastigodes hominis*, or *long thread worm*, is from an inch and a half to two inches long; the head is acute; the body spirally involuted in the male, almost straight in the female; the sheath of the penis in the male pyriform; the capillary portion

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* *Tricocephali.*—Corpus teres, elasticum, parte antica capillari subito in crassiorem transeunte. Os orbiculare, genitale masculum simplex vaginatum. FRANK, p. 186.

† *Tricocephalus dispar.*—Parte capillari longissima, capite acuto, corpore magis spiraliter involuto, fœminæ subrecto, vagina penis obovata. FRANK, p. 186.

forms about two-thirds of its whole length, and contains a white, pellucid, reddish or brown matter*.

The *Tricocephalus dispar* generally inhabits the cœcum and colon, and is rarely found in the small intestines.

The *Oxyures*† in general have a cylindrical and elastic body; subulate posteriorly (in the female); the mouth orbicular, and the penis enveloped in a sheath.

The *Oxyuris vermicularis*‡ of Bremser, the *Ascaris vermicularis* or *Fusaria vermicularis*, *A. Pollicaris*, *A. cauda sedacea*, *A. Græcorum*, *Vermis Ascaris*, *Maw or Thread worm*, has an obtuse head, with a lateral, vesicular, membrane; the tail of the male is obtuse and spiral; that of the female straight and subulate. It is generally

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* *Entozoorum sive Vermium Intestinalium Historia Naturalis*, &c. Auctore CAROLO RUDOLPHI, vol. ii, p. 89.

† *Oxyures.*—Corpus teres, elasticum, parte postica (fœminæ) subulata. Os orbiculare. Penis vaginatus. FRANK, p. 187.

‡ *Oxyuris vermicularis.*—Capitis obtusi, membrana laterali utrinque vesiculari, cauda maris spirali, obtusa, fœminæ subulata, recta. FRANK, p. 187.

from two to five lines long, small, white, and very elastic.

This worm is commonly found in the rectum; but is erratic: it is observed more especially in children; but not unfrequently is met with in adults also.

The *Oxyures vermiculares* are most commonly found *en troupe* in the intestines, in the form of a ball, and frequently so covered with mucus as not to be easily accessible to vermifuges. They are said by Frank to be more numerous and vivacious at the approach of spring than in the autumnal season. These worms do not reside entirely in the intestines, but occasionally, in young females, escape and lodge in the external parts of generation, or in the urethra, irritating these parts, and occasioning a sort of leucorrhœa and considerable annoyance*. A great number of these worms is said to have been found in the intestines of a newly born child; and cases have occurred in which large quantities of them have been thrown off the stomach by vomiting. Cysts full of the oxyures have also been discovered

* ZIMMERMANN, *Dissert. de Fluore Albo.* Goetting. 1788.

between the membranes of the stomach and œsophagus*. It is proper, however, to observe that great errors have been committed regarding this worm. Redi and Jördens, according to Rudolphi†, have both described, as a sort of Ascarides, the larva of the fly: and other eminent writers on verminology are described to have committed like errors; some of which can scarcely be credited as the mistake fallen into by Coulet, who confounded the separate joints of the *Tænia solium*, with the *Ascarides*, or by others who mistook for them the torn portions of the *Tricocephalus* or of the *Ascarides lumbricoides*.

The *Ascarides*‡ in general, under which term the *Ascarides vermiculares*, or *Oxyures vermiculares*, must not be confounded, have a cylindrical, elastic body, attenuated on each side; the head trivalvular.

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* Frank, *Libri citati*, p. 347.

† Rudolphi, *Libri citati*, vol. ii, p. 154.

‡ *Ascarides.*—Corpus teres, elasticum, utrinque attenuatum. Caput trivalve. Genitale masculum: spiculum duplex. Frank, p. 190.

The *Ascaris lumbricoides**, *Lumbricus teres hominis*, *Lumbricus intestinalis*, *Ascaris gigas hominis*, *Fusaria lumbricoides hominis*, or *long round worm*, has the head naked, the body furrowed on each side, and the tail somewhat obtuse. This worm is very common, is oviparous, and elastic only when dead†: it is most commonly met with in the intestinal tube; traverses the whole length of the canal, penetrates into the ductus pancreaticus, ductus communis choledochus, and gall bladder, ascends into the stomach and œsophagus, and is occasionally voided from the mouth. It descends also into the great intestines, forces the valve of the colon, and makes its exit at the anus. Occasionally the whole of the intestinal tube, from the duodenum to the anus, is filled with them; and they are at times voided in the form of a ball. Frank saw eighty passed in this manner in an acute fever. When dead, this worm is quite stiff. The *Ascarides lumbricoides* infest not only the small intestines of man, but also those of the ox, horse,

* *Ascaris lumbricoides.*—Capite nudo: corpore utrinque sulcato. Cauda obtusiuscula. FRANK, p. 190.

† FRANK, *Libri citati*, p. 190.

ass, and swine, and are generally from six inches to a foot in length, and from a line and a half to two lines in diameter at the middle: those of the horse are generally larger; being as much as sixteen inches long, and proportionably thick.

The largest *Ascaris lumbricoides* met with by Rudolphi was fifteen inches long, and the smallest an inch and a half.

The colour of every one is different, according to the matter which it may have imbibed, either by the mouth or the pores of the body. Frequently it is of a milky or brownish ash, rarely of a blood-red, colour*.

The *Strongyli*† have a cylindrical, elastic body, attenuated on each side; the mouth orbicular or angular; the tail of the male carrying at its extremity a sheath, whence issues the penis.

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* An excellent anatomical description of this worm, and of the *Echinorhynchus gigas*, a parasitic inhabitant of the intestines of quadrupeds, birds, reptiles, and fishes, but never of those of man, has lately been published by M. Jules Cloquet. See "*Anatomie des Vers Intestinaux, Ascaride Lombricoïde, et Echinorhynque Géant.*" Paris, 1824.

† *Strongyli.*—Corpus teres, elasticum, utrinque attenuatum. Os orbiculare vel angulatum: apex caudæ masculæ terminatus bursa penem emittente. Frank, p. 191.

The *Strongylus gigas** has an obtuse head; mouth surrounded with six flattish papillæ; the whole bursa of the male truncated; the tail of the female rounded. This worm is sometimes met with five inches, a foot, a foot and a half, and even three feet long, and from two lines to half an inch in diameter: it is erratic. Those found alive, especially in the kidneys, are of a blood-red colour; but when preserved in spirits of wine, they become brown, greyish, or white†.

The *Strongylus gigas* is commonly met with in the kidneys of man and several of the mammalia; rarely in other viscera, and still more rarely in the intestinal tube. By Chabert and others it has been confounded with the *Ascaris lumbricoides*. The genera are, however, distinct; and although the latter is seldom, if ever, discharged from the bladder, yet such an effect might be induced by a morbid process, as in two cases related by Frank; and similar instances have occurred in the practice of others,

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* *Strongylus gigas*.—Capitis obtusi, ore papillis sex, planiusculis, cincto, bursa maris integra truncata, cauda fœminæ rotundata. FRANK, p. 191.

† RUDOLPHI, *Lib. citat.* vol. ii, p. 212.

where union had taken place between the colon and bladder, ulceration followed, and the flatus and excrements were discharged with the urine. If any large *Ascarides lumbricoides* had escaped in this way, they might have been taken for the *Strongyli gigantes;* a mistake which, however, would not have been a very important one, in a therapeutical point of view.

None of the genera of the family *Acanthocephala* have been hitherto discovered in the human subject.

To the order *Trematoda**, belong those worms with a soft, depressed, or roundish body, having a solitary pore.

Of this order, three species, the *Distoma hepaticum*, *Polystoma pinguicolum*, and the *Polystoma venarum*, have been found in the human body; and of these, the first only in the intestines, and there but rarely.

The *Distomata*, in general, have a depressed or roundish and soft body; the anterior and ventral pores, solitary.

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* *Helminthi Trematodei.*—Corpore molli, depresso, vel teretiusculo, poro solitario instructi. FRANK, p. 193.

The *Distoma hepaticum**, *Fasciola hepatica*, *Planaria latiuscula*, *Fasciola humana*, *Fasciola lanceolata*, or *Fluke*, is obovate, flat, with subconical, very short neck; orbicular pores; that of the belly being greater than in the other species.

The *young* worms are from one to four lines long, and from one-third to two thirds of a line broad; of a variegated brownish-white colour: the *adult* are an inch, more or less, in length, and from four to six lines in breadth; dirty, and of a yellowish, greenish, or brownish colour.

The fluke has been found in the gall bladder of man, although not by any means commonly. Hence it passes occasionally into the intestinal canal. It is, however, one of the most common varieties of worm infesting the livers of animals, such as the sheep, the goat, the ox, the stag, the fallow-deer, the horse, the ass, the hog, the hare. In sheep affected with the rot, the liver is sometimes filled with them.

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* *Distoma hepaticum.*—Obovatum, planum, collo subconico, brevissimo, poris orbicularibus, ventrali majore. FRANK, p. 193.

It has been stated by some authors, that the *Distomata* have been met with not only in the biliary pores, but also in the branches of the vena porta; but this Rudolphi somewhat unceremoniously contradicts; and asserts, that whenever the liver is dissected, they are found only in the biliary ducts, whence they make their way into the gall-bladder, and by the ductus choledochus into the intestines; in all parts of which he has met with them. Frank however affirms, that, in 1758, a young child was publicly dissected at the hospital of Padua, who had died of small pox, when her liver was found to contain a considerable number of worms, some living and others dead; these were lodged in the ramifications of the vena porta and in the hepatic veins. They were of a red colour, slightly elongated, soft, and consequently somewhat different from the *Distoma hepaticum*. The true *distoma* has, however, notwithstanding the assertion of Rudolphi, been discovered alive in the branches of the vena porta*. The *distoma*, or fluke, does not always attack the substance of the liver. As many as

* Frank, *Libri citati*, p. 194.

fifty of them have been found in its parenchyma without having produced ulceration, or occasioned any sensible derangement of health. As the *distoma* is very small, enveloped in bile, mucus, and feculent matters, it is not by any means astonishing that it has not been more frequently met with in the human body.

The *Cestoidea**, which constitute the fourth family of these Entozoa, are characterized by an elongated, depressed, soft, continuous or articulated body. The head of a small portion of the species is simply labiated; of the others, furnished with two or four fossulæ or suctorial osculæ. They are all androgynous.

Of this family, the only species which inhabit the human body are the *Tænia solium* and *Tænia lata*.

The *Tæniæ*† in general are characterized by

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* *Helminthi Cestoidei.* — Corpus elongatum, depressum, molle, continuum vel articulatum; caput paucissimorum simpliciter labiatum, reliquorum bothriis vel osculis suctoriis duobus, aut quatuor instructum; omnia individua androgyna. FRANK, p. 197.

† *Tæniæ* vel *Bothriocephali.*—Corpus elongatum, depressum, articulatum, caput subtetragonum, bothriis duobus vel quatuor oppositis. FRANK, p. 198.

an elongated, depressed, and articulated body; with four suctorial oscula on the head.

The *Bothriocephalus latus**, *Tænia lata*, *T. vulgaris*, *Lumbricus latus*, *Ver solitaire*, *T. osculis lateralibus geminis*, *T. à anneaux courts*, *T. grisea*, *T. membranacea*, *T. tenella*, *T. dentata*, *T. humana inermis*, *Halysis membranacea*, *T. prima*, *T. osculis lateralibus solitariis*, *T. acephala*, *T. capitata*, *T. osculis superficialibus* or *Broad Tape worm*, has the head and marginal depressions oblong; scarcely any neck; the anterior articulations in the form of rugæ; the others short, almost square, broader, and the last slightly elongated. It is flat, or nearly flat, generally from ten to twenty feet long, and, at its broadest part, from a few lines to half an inch across. It is rarely discharged entire; is of a white colour; but when macerated in spirit of wine, becomes darker; whence it was formerly called by Pallas the *Tænia grisea*.

Goëze possessed a broken specimen of the *Tænia lata*, sixty yards in length.

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* *Bothriocephalus latus*.—Capite foveisque marginalibus oblongis, collo subnullo, articulis anterioribus rugæformibus, insequentibus plurimis brevibus, subquadratis, latioribus, ultimis longiusculis. FRANK, p. 198.

This worm is rarely met with in this country; but is much more common in Switzerland, Russia, and some parts of France. In the human body after death, according to Rudolphi, it has never, so far as he knows, been met with—a proof only of its being by no means a common parasite in the human species.

The *Tænia solium**, *T. osculis marginalibus solitariis*, *T. cucurbitina*, *T. humana armata*, *Halysis solium*, *Vermis cucurbitinus*, *Lumbricus latus*, *T. sans épine*, *Ver cucurbitaire*, *T. articulos demittens*, *T. secunda*, *T. à longues articulations*, *T. à anneaux longs*, *Ver solitaire*, or *long Tape Worm*, has an almost hemispherical, discrete, head; an obtuse beak; the neck full anteriorly; all the joints slightly obtuse; the anterior very short; the next almost square: and the rest oblong: the marginal foramina vaguely alternated.

The *Tænia solium* is commonly a few feet

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* *Tænia solium.* — Capite subhemisphærico, discreto, rostello obtuso, collo antrorsum increscente, articulisque anticis brevissimis, insequentibus subquadratis, reliquis oblongis, omnibus obtusiusculis, foraminibus marginalibus vage alternis. Frank, p. 200.

long ; sometimes, however, it is of an enormous length. Robin* found one adhering to the villous coat of the intestines on the dissection of a man, which extended from the pylorus to the distance of seven inches from the anus ; and Frank saw one, which is deposited in the Museum at Pavia, forty-seven cubits long. They are said even to have been met with of the enormous length of 600 feet. Van Doevern asserts, that a peasant, after having taken an emetic, vomited up forty Dutch ells of tape worm, and " would have got clear of more, if he had not been afraid of puking out all his guts, and for that reason bit the worm off†."

This worm is endowed with an undulatory motion, by virtue of which it changes its situation, curls up, swells out, enlarges or contracts its diameter, and becomes shorter or longer. The annuli, separated from each other, preserve for some hours their motive faculty. Occasionally it rolls itself into a globular form ; and, under

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* *Journal de Médécine*, tom. xxv. p. 222.

† Rosen Von Rosenstein *on the Diseases of Children*. Sparmann's Translation, p. 231.

such circumstances, becomes more heavy, falling from one side to the other like an extraneous body, when the patient turns quickly in bed. At other times it lengthens itself in the direction of the intestinal tube. When cramped by the position of the patient, or by pressure exerted over the abdomen, disturbed by aliment which does not agree with it, by medicine, or some disease proper to it, or tormented by the approach of death, it leaves hold, leaps about and falls, as it were, into convulsions*. Its presence does not exclude that of other worms, as has been imagined, the *Ascarides lumbricoides* and *Oxyures vermicularis* being frequently found along with it. Rosen knew a poor man's child, four years old, in a very emaciated and weak state; who, immediately after taking a small dram of barley brandy as a cordial, voided an immense quantity of the *Oxyures vermiculares*, eight feet of a slender *tape worm*, and ten of the *Ascarides lumbricoides*†.

The *Tænia solium* principally inhabits the

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* Frank, *Libri citati*, p. 201.

† Rosen Von Rosenstein, *Libri citati*, p. 236.

small intestines. It is not very common in this country.

On the two last classes of worms, the former of which includes the hydatid species, as they can scarcely be considered under the head of intestinal worms, we shall avoid making any observations.

With respect to the mode in which worms are generated in the human body, various opinions have been entertained from the earliest ages to the present period. The chief controvertists may, however, be condensed into two great classes; viz. those who believe in equivocal generation, and those who consider that the germs must be always received from without.

The first opinion reckons amongst its supporters almost all the names of antiquity since the time of Aristotle, as well as those of Needham, Buffon, Patrinus, Treviranus, Rudolphi, Bremser, Himly, and others of the moderns; whilst the second class comprises those who believe in the Harveian maxim—"*Omne vivum ex ovo*"—amongst whom may be ranged the majority of the physiologists of the present day.

Without occupying any time and space un-

necessarily, in adducing the various speculations which have been indulged by the possessors of these different opinions, it may be remarked, that there seems every reason for supposing that the latter class of believers is the more correct; whilst at the same time it must be admitted, that there are some anomalies which it is very difficult, under such belief, to reconcile.

"That the atmosphere," says Dr. Good, "is freighted with myriads of insect-eggs that elude our senses, and that such eggs, when they meet with a proper bed, are hatched in a few hours, into a perfect form, is clear to any one who has attended to the rapid and wonderful effects of what, in common language, is called a blight upon plantations and gardens. I have seen, as probably many who may read this work have also, a hop-ground completely over-run and desolated by the aphis *humuli*, or hop-green-louse, within twelve hours after a honey-dew (which is a peculiar haze or mist, loaded with a poisonous miasm) has slowly swept through the plantation, and stimulated the leaves of the hop to the morbid secretion of a saccharine and viscid juice, which, while it destroys the young shoots by ex-

haustion, renders them a favourite resort for this insect, and a cherishing nidus for the myriads of little dots that are its eggs. The latter are hatched within eight-and-forty hours after their deposit, and succeeded by hosts of other eggs of the same kind ; or, if the blight take place in an early part of the autumn, by hosts of the young insects produced viviparously ; for, in different seasons of the year, the aphis breeds both ways. Now it is highly probable, that there are minute eggs or ovula, of innumerable kinds of animalcules, floating in myriads of myriads through the atmosphere, so diminutive as to bear no larger proportion to the eggs of the aphis than these bear to those of the wren or the hedge-sparrow ; protected at the same time from destruction by the filmy integument that surrounds them, till they can meet with a proper nest for their reception, and a proper stimulating power to quicken them into life ; and which, with respect to many of them, are only found obvious to the senses in different descriptions of animal fluids. The same fact occurs in the mineral kingdom; stagnant water, though purified by distillation, and confined in a marble basin, will, in a short time, be-

come loaded on its surface or about its sides with various species of confervas; while the interior will be peopled with microscopic animalcules.

"So, while damp cellars are covered with boletuses, agarics, and other funguses, the driest brick walls are often lined with lichens and mosses. We see nothing of the animal and vegetable eggs or seeds by which all this is effected; but we know that they exist in the atmosphere, and that this is the medium of their circulation. How far the tales may be true, of living animals found in abscesses in different parts of the body, and especially in scirrhous and pustulous exanthems, this is not the place to inquire; but, conceding the fact, we can only account for it by supposing their respective ovula to have been admitted into the system with the air or food we take in; and to have been separated as soon as they acquired possession of a proper nursery.

"We have strong reason to believe, however, that many of the eggs or animalcules that are traced in animal fluids, occasionally find other receptacles out of the body that answer their purpose as well, and seem to keep up their respective species; and, consequently, that provide a

stock of eggs, larves, or insects prepared to take possession of any decomposing animal substance as soon as it is ready for their reception. And we are hence able to account for the presence of animalcules in such situations, without being driven to the necessity of supposing them to have been generated therein; and see how it is possible that they should continue to exist in a regular chain of succession, instead of being produced anomalously and equivocally by the *bildungstrieb*, (as the German physiologists call it,) or formative effort of a living principle in substances in which life has confessedly ceased to exist*."

Linnæus has affirmed, that the *Distoma hepaticum* or *fluke* has been met with in fresh water; the *Tænia vulgaris*, of a smaller size however, in muddy springs; and the *Ascarides vermiculares* in marshes and in the putrescent roots of plants. Gadd also affirms, that he met with the *Tænia articulata plana osculis lateralibus geminis* in a chalybeate rivulet; Unzer, the *Tænia* in a well; and Tissot asserts, that he found a *Tænia*, exactly similar to the human, in

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* *Study of Medicine*, vol. i. p. 294.

a river : whilst Leeuwenhoek, Schäffer, Palmer, and others, assert that they have found the *Distoma hepaticum* in water ; but Müller, who took very considerable pains in the comparative examination of the *Entozoa* which infest the human body, with those which are met with in springs, affirms that he has frequently detected the *Planariæ*, but never saw one like the *Distoma hepaticum**.

Those, who believe that the *Entozoa* are always received into the human body from without, have strenuously laboured to discover similar animalculæ in situations out of it, whilst the followers of the equivocal theory of their generation have as indefatigably endeavoured to shew that a considerable difference is always discoverable between the occupants of the two situations. Were it demonstrated, however, to a mathematical certainty that such a difference exists, it would be an argument of no force against the accuracy of the first opinion ; as the difference of locality, food, &c. might induce an important change in

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* Rudolphi, *Libro citato.*

their corporeal developement, and give occasion to all that diversity which is perceptible between the species of the same genus.

Granting that the germs of *Entozoa* are received in some manner from without, their occurrence in different stages of developement in the fœtus is a circumstance somewhat difficult of explanation under that theory. Small indeed must be that germ, which, when received into the mouth of the mother, can pass into her circulation, be transmitted through the placenta into the vessels of the fœtus, be deposited in some viscus, and there undergo its full developement; yet such cases have occurred, if the theory be correct: and, at all events, however it may be attempted to be explained, worms have been found in the fœtal state by individuals whose assertions cannot be called into question. Thus, Fromman has seen the *Distoma hepaticum* in the liver of the fœtus in utero of the sheep: Kerckring, *Ascarides lumbricoides* in the stomach of a fœtus six months and a half old: Brendel, *Tæniæ* in the human fœtus in utero: Heim, *Tæniæ* in the new-born infant; Blumenbach, *Tæniæ*

in the intestine of the new-born puppy: Goëze, Bloch, and Rudolphi, the same parasite in sucking lambs, &c. &c.*

The subject of the origin of these animalculæ being environed with so many difficulties, and as its consideration would lead to an endless enumeration of facts, which, after all, might, by the partisans of the contending opinions, be applied with equal appearance of correct appropriation to either, it will be more profitable, as M. H. Cloquet† has wisely observed, to endeavour to discover by what concurrence of circumstances favourable to their developement, the germs of *Entozoa*, whose presence had never been suspected, are suddenly animated in the human body, especially in the intestinal canal; where they are engendered with considerable facility,

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* Il est certain aujourd'hui, non seulement que la plupart produisent manifestement des œufs ou des petits vivans, mais que beaucoup ont des sexes separés et s'accouplent comme les animaux ordinaires. On doit donc croire qu'ils se propagent par des germes assez petits pour être transmis par les voies les plus étroites, ou que souvent aussi les jeunes animaux où ils vivent en apportent les germes en naissant."—CUVIER, *Libri citati*, p. 27.

† *Faune des Médecins*, tom. ii. p. 28.

preventing it from fulfilling its natural functions, and, consequently, acting injuriously upon the whole economy.

One of the most striking predisposent causes—the action of which, in the causation of this as well as of other endemic diseases, is enveloped in considerable obscurity—is the influence of climate.

According to Hasselquist, the *Tænia solium* is so common in Egypt, that a fourth part of the inhabitants of Grand Cairo are infested with it. It was formerly contended that the Dutch* and other nations subject to Tænia had become so from living so much on a diet of fish, in which species of Tænia are frequently found ; but this is denied by Müller, who argues, that if such were the case, the natives of Denmark and Pomerania ought also, from living much on such diet, to be subject to them ; which is not by any means the case. The *Tænia solium* appears to be generally more prevalent than the *T. lata* ; both ancient and modern writers mentioning it

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* Rosen has asserted that every other person in Holland, and every tenth person in Switzerland, were affected with *Tænia*. *Libri citati*, p. 226.

as the most common species in Egypt, Greece, Italy, Germany, Holland, England, and Sweden. In Switzerland, however, and Russia, the *Tænia lata* is more frequent. According to Linnæus, the most common species of *Tænia* met with in Sweden, is the *T. vulgaris*; but all the specimens which Rudolphi received from that country appertained to the *T. solium;* nor did the physicians there appear to have met with any genus so commonly. The most powerful illustration, however, of the influence of climate as a remote cause of verminous affections, is in the *Filaria medinensis* or *Guinea worm;* the occurrence of which is confined to the torrid climes of Asia and Africa, and is never observed in Europe or America, except in such as have contracted the disease in those regions.

Childhood appears to be the time of life most prone to worms. During the first two years, the *Oxyures vermiculares* are especially frequent, and they are also found occasionally in considerable quantity for some years afterwards. The *Ascarides lumbricoides* generally appear in those of an early age; but both the one and the other frequently recur at a more advanced period of life;

and are sometimes met with on the dissection of old people*.

Tæniæ are rare in childhood, but more common during youth and in after periods. The *Tricocephalus* and *Filaria medinensis* do not seem peculiar to any age. Nothing precise in this respect is known of the other worms which infest the human body. In the younger brute animals, worms would also seem to be more common; as the *Tænia* in the sucking lamb; *Ascarides* in the calf; and *Distomata* in young birds. *Entozoa* are, however, by no means rare in the older animals†.

Pallas, Werner, Frank, and the greater part of authors, have considered that the female sex are more especially subject to worms; and Rudolphi affirms, that of three cases of *Tænia* which occurred to him in town, and of numerous others

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* J'ai retiré à peine quelques uns de ces vers *(Ascarides lombricoïdes)* sur beaucoup de corps ouverts à l'hospice de la Salpêtrière, ou l'on ne reçoit que des personnes âgées: l'hôpital des enfants, au contraire, m'en a fourni en abondance; j'en ai recueilli quarante-deux sur un seul sujet.—J. Cloquet, *Libri citati*, p. 4.

† Rudolphi, *Libri citati*, vol. i. p. 408.

in different parts of the country, all the subjects were females ; but with respect to other worms, he cannot state from his own experience that the female sex are more liable to them.

"As parasitic plants," says the venerable Frank*, "grow in abundance in a soil abandoned to itself and uncultivated ; whilst they appear only here and there in a fertile field, vivified by the rays of the sun and the dews of the heaven, fertilized by a salutary manure, and by the sweat of the active husbandman ; so do these animals facilely multiply in cachochymic subjects, whilst they rarely attack healthy and robust individuals. It is in this that the predisposition consists." In addition to those causes above-mentioned which encourage this predisposition, may be enumerated, any general debility, hereditary or acquired, of the digestive organs ; a scrophulous habit ; a sedentary and idle life ; poor diet ; residence in a cold, confined, and damp situation ; and, in short, any thing which can be the occasion of debility of the alimentary canal and circumambient viscera ;

* *Libri citati*, p. 261.

in which the essence of the predisposition may be comprised.

On this subject, my friend Dr. Copland has very correctly observed, that a knowledge of the predisposing causes "furnishes a requisite indication to the successful treatment of worms, whatever may be their origin. Those who contend that the presence of ova is necessary to the generation of these animals, consider a robust state of the system to be subversive of their developement. Those who argue for equivocal or spontaneous formation grant the same proposition, but explain its influence in a different manner. They are of opinion, that, owing to a weak and imperfect chylification and assimilation, a material is formed, which, under the favourable circumstances of warmth and of an undisturbed state, assumes an organized and separate existence. These, however opposite, agree in the point of chief importance to the medical practitioner; they both point to the best means of preventing their future or continued generation*."

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* *Medical Repository*, vol. xvii. p. 244.

On this important point, the celebrated Darwin*, the products of whose fertile imagination, as has been with some correctness observed, were too often wont to

"Evaporate in similies and sound,"

has promulgated sentiments of the most erroneous and destructive tendency. Having observed that in hectic and putrid fevers lumbrici were occasionally voided, he has recommended, for their destruction, a diet of rotten eggs, putrid meat, &c. for the purpose of simulating the fetid stools which are passed in those diseases. Nothing could be more favourable than the practice, founded on this theoretical deduction for the continued propagation of those animalcules which it was the object to destroy.

Independently of those worms which have been before treated of, as finding a genial residence in the human intestines, and frequently occasioning comparatively trifling uneasiness, there are others to which Dr. Good has given the term *Helminthia Erratica;* different from those men-

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* *Zoonomia,* Class I. Ord. i. Gen. iv. Sp. x.

tioned under the same head by Rudolphi, who confines it to those *Entozoa* whose usual seat is in one part of the intestinal tube, but which migrate into other portions of it. Dr. Good's definition of the *Helminthia Erratica* is as follows: "Worms, or the larves of insects, introduced by accident, and without finding a proper habitation in the stomach or intestines; producing spasmodic colic with severe gripings; and occasionally vomiting or dejection of blood." Those animalculæ which have most commonly been thus swallowed, are the Hair-worm, the Leech, the grubs of the Fly, of the Caddy-insect, the *phalæna pinguinalis*, the larves of the bee, the spider, the *Triton palustris*, the *lacerta aquatica*, &c. But as such instances are but rarely met with in children, and as their treatment must rest upon general principles, it is unnecessary to go into any further description of them here. All these, from change of locality and other causes, are very much altered in structure from those which are seen out of the body; so much so, indeed, that it is at times very difficult to determine the exact external species to which they belong: which furnishes a strong corrobora-

tive argument for the opinion, that the germs of intestinal worms are received from without; but that, owing to the different circumstances under which they are situated within the body, they become importantly changed in their structure. Of all the erratic worms and grubs, the *Hirudo sanguisuga*, or horse-leech, would seem to undergo the greatest metamorphosis; as, in one case, it is reported to have reached the size of a man's fist, and to have contained a pound and a half of blood*.

The great difficulty occasionally experienced even by the best helminthologists in making out the exact species to which any worm, accidentally presented to their notice, may belong, has been the cause of much empirical imposture; and the numerous bottles in the windows of the quack will be frequently found to contain not only the *Entozoa* found in other animals, but substances having no relation with them except by similitude. A fact given on the authority of Frank, will sufficiently shew the necessity of the young helminthologist being cautious in pro-

* Good, *Libri citati*, vol. i. p. 308.

pounding an opinion respecting any entozoid substance which may be presented for his inspection.

A short time after the arrival of Frank at Pavia, a young man, who was educating himself for an *officier de santé*, placed before him, in a bottle containing alcohol, a worm of an unknown species, which a female, he affirmed, had voided *per anum*. For this he demanded six *louis*. Frank answered him by a smile ; he then assured him that the pretended worm was alive when discharged, and that he had himself seen it move. As Frank had no doubt of the dishonesty of the adventurer, he discharged him, saying he had no want of his merchandize. He then sought out a celebrated individual, who had rendered great services to Natural History, but was little versed in Helminthology, and still less on his guard against the artifices of imposters : he was consequently readily taken in. The imprudent purchaser, on examining the body suspended in alcohol, not only took it for a worm, but adorned it with the name of *Physis intestinalis ;* hastened to have it engraved, struck off a magnificent plate, with which he ornamented the

collection of his works, and dedicated it to an English *savant*, who occupies a distinguished rank in Europe. An envious individual, who knew the cheat, and was perhaps the author of it, spitefully hastened to publish, that the *Physis intestinalis* was neither more nor less than the œsophagus of a young chicken*.

The symptoms which indicate the presence of worms in the human body are very obscure. It has indeed by some been affirmed that they are perfectly innocuous; whilst others have, on the contrary, ascribed almost all the diseases to which mankind is subjected to their agency. Both these sentiments are erroneous; there cannot be a doubt but that the health is occasionally very much injured by them; whilst they are not entitled to such extensive agency in the causation of disease as has been by many imagined. Some years ago, Frank was requested to see a prince who had been attacked with epilepsy.

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* Hic scriptorem, juste celebrem, sed nimis credulum, expectavit alterius, æmuli, malignitas; qui *Physin intestinalem* viri sibi odiosi, *nihil aliud, quam pulli gallinacei œsophagum esse*, fraudis, proprio forsitan jussu susceptæ, haud ignarus, tam publice quam inimice docuit.—Frank, *Libri citati*, p. 182.

His physician, a respectable old man, assured him that he could make him void at pleasure thousands of filiform worms. As he was neither able to define the genus nor species of these worms, the quantity of which, from his account, seemed to be prodigious, Frank requested to be a witness of the phenomenon. The physician administered a dose of castor oil, which procured many stools, in which were thousands of whitish filaments similar to small eels ; but, on an attentive examination of these pretended worms, they were found to consist entirely of the castor oil in a state of coagulation.

The general symptoms which have been considered to indicate the presence of worms, and to which M. Alibert has given the term *helminthiasie*, although they are all occasionally fallacious, are as follow. Commencing with the *head*, which is generally affected ; the face is tumid and pale, or even livid ; the lower eyelid becomes of a leaden colour ; an itching or sensation of tension is felt in the nose ; occasionally, the sense of smell is depraved or lost, and hæmorrhage from the nose takes place ; during sleep, the saliva runs down over the pillow ; the breath has a remark-

able fœtor ; and stridor of the teeth, especially during the night, with a mucous sordes on the tongue, manifests itself; unusual stammering ; aphonia ; loss of articulation ; strabismus ; retraction, contorsion, or fixed state of the eyes ; dilatation and immobility of the pupil ; sudden amaurosis ; moroseness ; unusual stubbornness of disposition ; frightful dreams ; cries and terror when awake ; chorea ; risus sardonicus ; vertigo ; delirium, and profound stupor, are also generally present, singly or combined.

One of Frank's friends informed him, that he had a patient labouring under worms, who, for a quarter of an hour, saw all objects tinged yellow. This optical illusion entirely disappeared on the expulsion of the worms*.

The *chest* is sometimes affected with frequent dry cough, accompanied with tickling in the larynx ; interrupted sighs like those of children,

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* Huic ægro, quin *ictero* unquam laborasset, et quin oculorum illius humores colorem normalem mutassent ; singula hinc inde objecta, quasi *flavo colore tincta*, per horæ quadrantem, apparuisse ; hoc interim a phænomeno, hunc virum, quo tempore vermes deposuisset, liberatum fuisse. — FRANK, *Libri citati*, p. 218.

sobbing; anxiety at the præcordia; acute pains, simulating pleurisy; failure of the milk in nurses; hiccup and other convulsive movements of the diaphragm; with the sensation of a foreign body rising slowly from the stomach along the œsophagus. Occasionally, worms reach even the nasal fossæ or fall into the glottis, producing suffocation, of which Frank has seen one example.

The phenomena presented in the *abdominal region* may be considered as, in some respects, idiopathic. Frequently, the irritation is confined to one or two points of the intestinal tube, whilst its sympathetic effects are felt in its whole length. Occasionally, the hunger is insatiable, and accompanied with a daily progressive state of emaciation; the appetite is variously modified, sometimes nausea, retching, cardialgia, vomiting, and expulsion of worms from the mouth, occurring; whilst at others, borborygmi; sudden swelling of the abdomen, now and then simulating pregnancy; a sense of cold, gnawing or tearing, in the intestines; inanition; palpitations; sensation of an extraneous body creeping, becoming elongated, or retracted upon itself; partial tumefaction of the abdomen; meteorismus; eructations; intus-

susception; tormina; spasms; colic; retraction of the abdominal parietes; tenesmus; hæmorrhoidal symptoms; discharge of mucus *per anum* or *per vaginam;* mucous diarrhœa, containing very fetid black feces; the *debris* of rotten worms; the annuli of the *Tæniæ*, or worms rolled in the form of a ball; obstinate constipation; derangement of the menstrual flux; abortion; whitish or thick urine; dysuria; ischuria; obstruction and inflammation of the intestines, have all been enumerated amongst the symptoms produced by the presence of worms through the nervous communication existing between the intestines and the different parts of the body.

M. H. Cloquet considers that the chief symptoms which indicate the presence of worms in the digestive canal, are, dilatation of the pupil; itching of the alæ nasi; sour smell of the breath; lividness or paleness of the countenance; irregular digestion; emaciation; feeling of creeping or tearing in the abdomen, and salivation*.

With regard to the question, "Whether perforation of the intestines is ever occasioned by

* *Libri citati*, tom. ii. p. 39.

worms?" Frank* affirms that, during fifty-four years' practice, although he has opened several thousand bodies, he never met with one instance which could be rationally attributed to these animalculæ. Garman has related a case where more than a hundred worms were discharged from an abscess in the pubic region communicating with the intestines: Schellhammer, one of lumbrici discharged from an abscess in the inguinal region: Hunerwolf, a case of enteritis, with perforation from worms: Heister and Coith, of lumbrici found in the cavity of the abdomen, with the intestines perforated; and many other similar examples have been handed down by authors: but it seems most probable, that the perforation in such cases had been occasioned by some ulcerative process set up in the intestines, which might or might not have been primarily produced by the irritation of worms, and not by a *direct* perforation accomplished by those animals. In all the instances which have been recorded, the appearance of the parts has confirmed this sentiment; the openings in the

* *Libri citati*, p. 221.

intestines being in none of the cases like what would have been produced by the simple perforation of a worm : on the contrary, a considerable loss of parts was observed, as if it had been occasioned by some morbid and destructive process established in the intestine. With this explanation, Rudolphi and Bremser are both inclined to accord. To deny, however, the possibility of their being able to perforate the intestines, as some have affirmed, would be absurd.

Such is a picture of the general symptoms presented by worms. As was before said, none are unequivocal ; but each and every of them, with the exception of the discharge of the worms themselves, may occur from irritation of the intestinal canal induced by other causes*.

The symptoms of invermination vary according to the exact species with which the patient may be affected ; but of these symptoms, also, we unfortunately know nothing very precise ; the only certain evidence of the existence of any

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* Il faut convenir d'ailleurs, que le seul signe véritablement pathognomonique de la présence des entozoaires dans la cavité des intestins est l'évacuation de quelque ver.—H. Cloquet, *Lib. citat.* tom. ii. p. 41.

particular variety, being its presence in the evacuations; still there are some derangements occasioned by particular species which it may be well to designate; those varieties which are more uncommon, as the *Strongylus gigas*, the *Tricocephalus dispar*, and the *Distoma hepaticum*, producing no diagnostic symptoms leading to a knowledge of their presence, being passed over.

The *Oxyures vermiculares* occasion a troublesome, and often almost insupportable, itching at the anus, which, in many instances, increases towards evening and during the night. The worms are discovered in the stools like small white threads, and occasionally creep out from the rectum. They not unfrequently induce *procidentia ani*, and tenesmus is by no means an unusual concomitant.

The presence of the *Ascarides lumbricoides* is indicated by a sensation of itching and pungent pain in one or more points of the intestinal tube, especially towards the umbilicus; with the ejection of one or more of these worms from the mouth or anus.

When *Tæniæ* are present, there is a sensation of circumgyration and heaviness in the abdomen,

or of pricking or gnawing in the vicinity of the stomach; very great appetite with considerable emaciation, and the discharge of one or more of the joints of the Tænia by vomiting, or *per anum*. Lipothymia, cardialgia, a considerable flow of saliva, and itching of the fauces, have also been described as in their train.

The prognosis of verminous affections has been so correctly appreciated and described by Frank, to whose interesting work we have already had frequent occasion to refer, that we shall give it in an English version from that author's words.

" In enumerating the symptoms of verminous affections, I have pointed out their prognosis. It has been shewn that the symptoms produced by the presence of worms, are at one time trivial, at another severe; and that, in some cases, from their occasioning no inconvenience, there is no evidence of their existence. Intestinal worms are more exposed to the action of remedies, adapted for their destruction, than those which fix their residence in the parenchyma of other viscera. They find themselves, however, protected by the mucus which lines the alimentary canal, by the

fecal matters with which they are enveloped, and by the folds of the mucous membrane in which they conceal themselves. At other times, as is frequently observed in cases of Tænia, the head is firmly implanted in the tissue of the intestines. It is consequently not astonishing that, in a considerable number of cases, they are but little sensible to the action of anthelmenthics and obstinately resist these remedies, or that the articulated worms should suffer only the loss of some of their rings which is speedily repaired. Occasionally, they seem to sport with the physician : after having braved his efforts, they make their exit spontaneously ; but commonly leave, in the intestines, germs which perpetuate their species and compensate for their voluntary disappearance.

" All the species of intestinal worms do not offer the same resistance to the means employed by the physician ; in general, the *Ascarides lumbricoides* yield readily ; the *Oxyures vermiculares* are more difficult of expulsion ; the *Tænia solium* is still more obstinate ; whilst the *Bothriocephalus latus (Tænia lata)* is almost invincible, and requires a treatment which sometimes endangers the life of the individual affected with it. In-

duced by these observations, or led away by a spirit of novelty, some authors have confirmed the old proverb, "*nihil est tam absurdum quod non docuerit philosophus*," by maintaining that worms are intended for absorbing the superfluous mucus of the intestines, to increase their peristaltic action, by the irritation which their presence occasions in the structure of these organs; and, consequently, that they are useful to man, instead of being injurious to his health. It must be confessed that the predisposent causes of worms exercise the greatest influence in the production of diseases which are attributed to those animals; that an infinite number of persons carry worms in their intestines during the whole course of a long life without being much incommoded by them; that physicians sometimes gratuitously conceive, to the prejudice of the patient, the existence of these animalculæ, and that, in several cases, more commonly indeed than is imagined, where they really do exist, they are not the cause of the disease which is ascribed to them. The symptoms, however, induced by worms themselves, prove that the morbid affections attributed to them are not always chimerical. In children,

women, and men of a delicate constitution, worn down by enervating causes, labouring under different severe diseases, as scarlatina, variola, and measles, worms frequently exert great ravages, and even occasion death. Nor are they less to be feared when they attack organs essential to life. The *Ascarides lumbricoides*, which are so common, produce more unpleasant symptoms when they ascend into the stomach than when they remain in the intestines. When worms creep out spontaneously by the mouth or anus at the end of fevers, they are doubtless driven away by the morbid heat, or by the hunger which they feel owing to the patient's taking no food. They are also observed to creep out at the approach of death, during the time of the agony, and when the patient has rendered his last sigh. Hippocrates regarded the exit of worms at the termination of a disease as a favourable presage—" Lumbricos teretes, morbo judicium subeunte, una cum excrementis prodire, utile erit." This occurrence, however, I have frequently witnessed without either a favourable termination having followed, or any change even having been induced in the progress of the disease.

"Those who are convalescent, after a severe fever or any serious disease, slowly recover their strength when affected with Tænia. Hippocrates observes, when speaking of the *lumbricus latus*—"Qui hunc vermem habet, ei toto quidem tempore nihil valde metuendum accidit; cum vero debilis exstiterit, ægre reficitur; vermis enim eorum quæ ventriculum ingrediuntur, partem aliquam assumit. Si igitur, ut convenit, curatus fuerit, convalescit; si vero non curatur, suâ sponte non exit; mortem tamen non infert, sed unà consenescit." After the expulsion of the worms, the symptoms frequently persist for one or two days—the agitation of the sea not being calmed immediately after the cessation of the tempest. This morbid concussion depends on the habit of being irritated which the intestines have contracted from the presence of the animalculæ; but frequently it is the effect of drastic purgatives incautiously administered, and is a condition of the system which almost merits as much attention as the worms themselves. Violent remedies favour the reproduction of the worms, and give rise to innumerable evils. An ancient French author, who has been distinguished for

a treatise on Verminous Affections, affirms that, in children which succumb under convulsions occasioned by worms, death is announced by blackish stools; and he therefore maintains that black vomiting after the exit of the worms is a precursory sign of a fatal termination. These two assertions I have never had an opportunity of verifying. There are not, indeed, sufficient data on which to found a correct prognosis in cases of worms*."

It has been before stated that the grand predisponent cause of worms is a want of due tone and vigour in the system, and in the digestive organs more especially. In the treatment of verminous affections, consequently, the chief attention must be paid to the removal of these, as well as of the other, predisponent causes mentioned in a former section. Without this important desideratum, we may destroy by anthelminthics one set of these parasites; but others will continue to be produced. The subject of verminous disease should therefore respire a pure air, take proper exercise, avoid the use of crude,

* Frank, *Libri citati*, p. 267.

indigestible, nourishment, and, in short, adopt every means of improving the tone of the system. Tonic remedies may be employed to aid the influence of regimen; or, where the latter cannot be obtained, owing to poverty or any other cause, the corroborants may be used alone: but of these we shall have occasion to speak hereafter.

The number of anthelminthics which have been boasted of by one writer or another, is prodigious. So many of them, however, are decidedly unnecessary, or are eclipsed by others of greater potency, that we shall only notice those which seem to be entitled to more especial mention.—"Artis est, ex miscellaneâ farragine, optima et usu comprobata seligere."

In the prosecution of helminthology, several writers have made experiments on worms which have been voided from the body, under an expectation that some light might thus be thrown on those agents which would be likely to be most detrimental to them whilst in the animal frame. *Entozoa* discharged from man or the lower animals, or those found on dissection, are capable of preserving life for some

time. Those which are found in warm-blooded animals will live in warm water; but in cold they grow rigid, and are soon killed. Rudolphi however, kept an *Ascaris lumbricoides* for a night and day in cold water, when it seemed motionless and dead; but, on dissection, it exhibited signs of life. The same author found some *Ascarides osculatæ* alive in a *Phoca vitulina*, or seal, which had been killed the day before; and, putting them for a short time in the morning into an oven, in water moderately warmed, some lived twenty-four hours, others thirty-six, and a few somewhat longer*. This, however, rarely happens; for, in general, the *entozoa* which inhabit those animals endowed with warm blood, quickly perish in a cold medium. They better endure warmth; but if the medium be hot, they die curled up and contracted.

Redi undertook several experiments on the human *Ascarides lumbricoides*, of which the following is a summary:—In *cold water* they lived from sixty to seventy hours: in water containing a large quantity of *Terra sigillata*, the

* Rudolphi, *Libro citato.*

same time: in an infusion of *coralline*, more than sixty hours: more than thirty in water rendered bitter with *aloes:* and in an infusion of *horn shavings*, as long as in common water. In water saturated with *salt*, they died speedily: in *brandy*, more so: and in *rose* and *orange flower water*, they lived for ten hours: in *syrup*, and the experiment was oftentimes repeated, they died within three or four hours: in *wine*, one lived twenty-four, another forty, and a third seventy-four hours. Worms, from a species of *Tetrodon*, anointed with oil, lived for thirty-seven hours*.

Pallas relates that a *Tricuspidaria*, a species of Tænia infesting the digestive tube of certain fishes, lived for a night and day in common *malt spirit;* and, if we are to believe an anonymous writer in *Duncan's Medical Commentaries*, two Tænia voided by a dog were neither affected by *hot water* nor the *strongest brandy*, but were at length killed by a solution of the *Oxymuriate of Mercury*.

It has often been disputed whether the *fat*

* *Degli Animali viventi*, p. 126—130.

oils are noxious to worms. They who believe that these *entozoa*, like insects, are furnished with spiracula, have thought that, by pouring oil upon, or anointing, them, the spiracles would become obstructed, and hence the animal die. The human *entozoa*, however, are not furnished with spiracula, nor do experiments prove the noxious agency of oils*. Wagler, in one of his letters to Goëze, asserts that a *Tricuspidaria* being immersed in oil, it soon became languid and moved feebly, and in sixty hours was dead. With human *entozoa*, however, the thing is otherwise. Coulet affirms that he found the *cucurbitini* live as long in *oil of almonds* as in any other fluid. Arneman also instituted several experiments with the fixed oils, of which the following is a summary. In order to the correct knowledge of the action of the oil upon these animals, he properly advises that the oil should be tepid; otherwise the cold itself might stiffen and kill them: as even when cold oil is added to the tepid, they twist about in an extraordinary manner, and become rigid.

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* Rudolphi, *Libro citato.*

Human *Ascarides lumbricoides*, as well as those of the swine, lived several days in *oil*, being kept in a warm situation. They were in all cases, however, affected with restlessness and contortions; but their bodies became gradually languid and lax; the movements were executed with difficulty, and, as it almost seemed, with a sense of pain; whilst the skin was contracted into rugæ. In the *oil of sweet almonds*, a lumbricus of the hog lived for twenty-seven hours, another for thirty: human lumbrici for forty-six and for fifty-three. In the *oil of bitter almonds*, the lumbrici of the hog lived for eighteen, twenty-four, and thirty-nine hours; whilst the human died within thirty-four: in *castor oil*, that of the hog for fifty-six; the human, for from forty-four to forty-eight; the distoma hepaticum for eight: in *linseed oil*, those of the swine from eighteen to twenty; the human, from twenty-three to twenty-six: in *oil of walnuts*, those of the swine twenty-two; the human, twenty to twenty-five: in *oil of the hazel-nut*, those of the hog nineteen; the human, twenty-six: in the *oil of the poppy*, those of the hog twenty; the human, seventeen, twenty-two, and twenty-seven: in the *oil of elder*, those

of the hog twenty-eight; the human, two and three: in the *oil of hyoscyamus*, those of the hog eighteen and twenty-two; the human, twenty-seven: in the *oil of the beech*, those of the hog from twenty-nine to thirty-two; the human, forty to forty-six: in the *oil of hemp*, those of the hog sixteen and twenty-three; the human, twenty-seven: in the *oil of mustard*, both those of the hog and man, thirty-six: in *rape oil*, those of the hog twenty-one to twenty-six; the human, twenty-eight: in the *oil of behen* the human lived twenty-six hours.

Chabert, having tried various articles, at length, by his *empyreumatic oil*, which will be hereafter described, succeeded in killing every kind of worm either immediately or after the lapse of a few minutes.

From the above experiments, it would seem that cold and spirituous fluids* are very detrimental to entozoic existence, out of the

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* The various experiments instituted by different individuals have been extremely contradictory. Rosen Von Rosenstein declares that he saw a worm in the evening still alive, which had been expelled from a child in the morning and kept the whole day in spirit of wine.—*Libri citati*, p. 230.

body. A decisive vermifuge process, however, as Dr. Good has very correctly observed, is yet a desideratum in medical practice; worms in general being situated so low in the intestinal canal, and so involved in its mucus, that those remedies which readily destroy them out of the body, are considerably mitigated in their action on those inhabiting the human frame: whilst some of those that are recommended have a tendency, at the same time, to weaken the tone of the stomach and bowels, and thus, by augmenting the predisponent cause, to increase the disease. It was on this account that Dr. Heberden was induced to advise, that, until some more certain remedy should be discovered, our therapeutical endeavours should be restricted to keeping the bowels loose, during which state he considered they might be easily submitted to, and by degrees be safely evacuated.

Although, however, the use of violent drastics, frequently repeated, is strongly to be deprecated, owing to the debility which they are likely to occasion in the digestive organs, yet the occasional exhibition of a brisk cathartic is often a

valuable agent. By stimulating the intestines to throw off the retained fæces and mucus in which the worms become enveloped and find a nidus favourable for their continued generation, they enable those anthelminthics which may be prescribed to come more immediately into contact with the animalculæ, and consequently should be made to precede the use of those remedies. Nor is it alone prior to the administration of anthelminthics, that cathartics are useful: when the former have been administered for a few days, and there is reason to hope that they have occasioned the death of the unpleasant tenants, a brisk cathartic may be advantageously exhibited, for the purpose of removing any accumulation of dead animal matter which may have taken place, and thus of diminishing the tendency to a fresh generation. The neutral salts which have generally been recommended in verminous affections, are the muriate of soda, of which Professor Hamilton speaks very favourably, and the sulphate of the same alkali. These salts, it is probable, do not only act mechanically as cathartics, but also both as direct and indirect anthelminthics. Redi, as

has been before observed, found that worms soon perished in a saturated solution of common salt, when out of the body; and it has been remarked to be the best prophylactic against the attack of flukes in sheep. Common observation proves it to be an excellent stimulus to the digestive organs in the human subject; whilst the agriculturist has daily opportunities of appreciating its worth as a corroborative to the digestive functions of his cattle. It is, on these accounts, a valuable agent in the verminous affections of children; more especially as it is, in general, by no means unpleasant to them, but, on the contrary, appears to be grateful to their taste. Castor oil, gamboge, scammony, the black and fetid hellebore, &c. have also been recommended; but they seem to possess no virtues over common cathartics; of which the best are, calomel, aloes, gamboge, jalap, or rhubarb singly or combined.

Of the *mechanical anthelminthics* exhibited at the present day, there are two only which are admitted into general use: these are the filings of, or granular, tin and the cowhage. Charcoal has indeed been recommended by Pallas; but its

action, in all probability, consists wholly in the stimulus which it gives to the gastric apparatus: this property, as is well known, being advantageously made use of to assist in the fattening of different animals.

Of the *Stannum granulatum*, or granular tin, the testimonies in its favour are extremely numerous. Amongst others, Alston, Pallas, Bloch, Marx, and Brera, have strongly recommended it, especially in cases of the *Tænia solium*. Alston conceived its good effects to arise from its combination with arsenic: but this supposition has been negatived by the equal success attainable from its exhibition in a pure state. It is difficult to explain its *ratio operandi;* but, in all probability, it consists in the incessant annoyance occasioned by the friction of the particles of tin, which renders the habitation uncomfortable to its occupants, and induces them to migrate; whilst the same friction upon the mucous coat of the intestines increases their peristaltic action, and favours that object. It may be given to children in doses of from half a dram to two drams, in treacle or syrup, twice a day; and it will be

advisable to assist its operation by one of the cathartics above mentioned, exhibited about twice a week during its administration.

If, however, the mode of action of the stannum be difficult of explanation, that of the *Dolichos pruriens*, the *Stizolobium* or *Cowhage*, is still more extraordinary. The setæ or pubes covering the pods of the *Dolichos pruriens* were at one time alone recommended; and it is this species which has been admitted into, and is still retained in, the London Pharmacopœia. According to Persoon*, however, all the eight species of the *Stizolobium* are equally prurient and anthelminthic. That this pubes is useful in invermination, there can be but little doubt: the facts recorded by Kerr, Cochrane, Bancroft, Macbride, Chamberlaine, and others, are sufficient to prove this; and I have myself seen its exhibition followed by the evacuation of worms, a result which had not supervened on the administration of other anthelminthics. It has by many writers been conceived, that if the cowhage possess any influence over worms, it ought equally to irritate

* *Synopsis Plantarum*, P. ii. p. 298.

the mucous coat of the intestines over which it passes, which is not the case; and hence they have imagined that, owing to the absence of such effect, the medicine must be inert. The numerous facts, however, which have been related, cannot be set aside by any visionary speculations; and the absence of irritation in the mucous lining of the fauces, œsophagus, and intestinal tube in general, merely proves that that tunic is not so sensible as might have been imagined*. Under another head† we shall have occasion to remark, that it is frequently affected with inflammation and even partial or total disorganization, without any symptoms having been present to sufficiently account for the existence of so severe a lesion.

The Dolichos pruriens may be exhibited in the dose of from half a tea-spoonful to a tea-spoonful, according to the age of the child, night and morning, made into an electuary with common syrup, treacle, or honey.

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* Horum tunica interna muco obtecta sensibilitatem magnam non prodit, ut ventriculi intestinorumque vulneribus externe patentibus compertum habemus. — RUDOLPHI, *Libri citati*, vol. i. p. 490.

† See CHAPTER 7th. Of INFLAMMATION OF THE STOMACH.

Numerous other mechanical agents, as has been before observed, have been given, with the effect of dislodging *Tæniæ* and the *Ascarides lumbricoides*, especially the former; they all, however, in order to act beneficially, require to be administered in such large doses, that they are apt to induce nausea, to debilitate the digestive organs; and, consequently, to augment the predisposition to the disease, and the consecutive generation of the very beings they were intended to destroy.

Of the various remedies which have been considered as *true anthelminthics*, or, in other words, as destructive of entozoic life by some principle, poisonous to them, which they contain, it is difficult to give any correct classification. The catalogues of the Materia Medica present us with an immense variety of such remedies; but, as in the case of those recommended for every other affection, a great majority are almost, if not wholly, inert. *Oil of turpentine*, simply or combined, and the *semina santonicæ* or worm-seed, are the only two which it appears necessary to retain. These, with the proper administration of cathartics, as before directed, are generally suffi-

cient to free the intestines from their parasites ; and if they fail, but little dependence can be placed on any of the other means to which the term *Anthelminthic* has been appropriated.

Of the vermifuge efficacy of the first of these remedies, numerous cases have presented themselves, within the last few years more especially. No variety of intestinal *Entozoa* seems capable of resisting its deleterious action. We have already remarked, that the *Oleum empyreumaticum* of Chabert, which is a compound of turpentine, was found to be extremely destructive to parasitic existence when out of the body ; and it has been found no less energetic when internally exhibited. But of both this and the *Semina santonicæ*, we shall have occasion to treat hereafter.

M. H. Cloquet, in an elaborate disquisition on the *Ascaris lumbricoides*, has summed up by observing, that the most useful agents in the treatment of that variety of *Entozoa*, are—1. The aqueous decoction of the *Hydrargyrum purificatum*. 2. *Calomel*. 3. *Castor oil*. 4. *Camphor*. 5. The *Veratrum sabadilla*. 6. The *Corsican moss*. 7. *Jalap*. 8. The *Semina santonicæ*. 9. The rob of the leaves of the *Juglans*

regia or *walnut tree*, and the green husk of the *walnut*. 10. *Garlic*. And, lastly, *Tin**. The incongruous preparation to which he has assigned the first and most conspicuous place, we have but little hesitation in designating as thoroughly inert; and several of the others can by no means be considered as anthelminthics.

To aid the action of internal vermifuges, or where, from incessant vomiting or other causes, these cannot be exhibited, it has been recommended to apply the remedies externally. In more early ages, this practice was much esteemed and the greatest reliance reposed on it† ; and, although but rarely adopted in this country, is much recommended by continental practitioners.

M. Cloquet‡ affirms, that he has seen *Ascarides lumbricoides* evacuated in a state of torpor after the abdomen of the patient had been rubbed with a mixture of ox's gall and common soap, with the oil of tansy or of camomile,

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* *Faune des Médecins*, tom. ii. p. 151.

† Leonelli, *de Morbis puerorum*, Cap. liii.—1544.

‡ *Libro citato.*

strongly impregnated with camphor and garlic, or with milk, holding aloes in solution, impregnated, *secundum artem*, with the bitter principle of the colocynth and camphor; or with a *maceratum* of bruised garlic in camphorated sulphuric ether. A similar effect, he says, is produced by the application of a plaster composed of yellow wax, litharge, assafœtida, and galbanum. He also recommends a medicament which is neither of the most elegant nor easily obtainable nature; viz. assafœtida dissolved in the *gastric juice!* "*ou, ce qui est beaucoup plus simple, dans de la salive*" *!!* Other external applications have been advised by Laennec, Barton, and others; their *modi operandi* are, however, resolvable into one of two varieties. The terebinthinate or strongly odorous applications, it is possible, may be absorbed into the system, and thus prove deleterious to the inhabitants of the intestines; but this cannot be the case with others which have been had recourse to. It is indeed highly probable, that the friction, cataplasms, &c. are, in almost all cases, indirect anthelminthics only; the communication of nervous energy to the intes-

tinal tunics being the first effect, and the expulsion of the worms a secondary consequence.

During the whole course of the treatment for all the varieties of intestinal worms, more especially when the constitution is deeply implicated, the patient should be placed under the favourable circumstances mentioned at page 50. The corroborant remedies most worthy of recommendation, are, the sulphate of quinine, the vinum ferri, or any other of the preparations of iron, administered in doses proportioned to the age and capability of the patient. On the tonic treatment, let it always be borne in mind, it is, that we are to depend for the annihilation of the predisposition to invermination. Anthelmintics may destroy the animalculæ which are in a forward state; but whilst a want of due vigour exists in the performance of the gastric functions, a tendency will remain to the development of the ova contained in those viscera, and the unpleasant symptoms occasioned by the adult animalculæ continue to recur so long as such want of tone persists.

With regard to the treatment of the particular

variety of intestinal worms with which the animal frame may be affected, it has been already observed, that we are not possessed of any diagnostic sign, which can indicate the presence of one more than that of another, if we except the local symptoms occasioned by the *Oxyures*, or the presence of one or other in the evacuations. This is, however, of the less consequence; as they are all induced by the same causes, and more or less affected by the same vermifuges. Of the various species, moreover, which have been described as inhabiting the human intestines, two only are generally found in childhood—the *Ascarides lumbricoides* and the *Oxyures vermiculares*. *Tænia* are every now and then observable; but the treatment which is best adapted for them is fortunately nearly identical with that required for the expulsion of the *Ascarides lumbricoides*.

The *Oxyures vermiculares* are the cause of very considerable irritation to children, and are by no means easily expelled. As they are generally confined to the lower portion of the intestinal tube, they are most easily destroyed by remedies exhibited in the form of clyster; but it will be generally advisable to aid the use of

these means by others given by the mouth; as they have occasionally been found in the upper portion of the alimentary tube, whence they have been rejected by vomiting; and it is not by any means improbable that the annoyance occasioned by the clyster may induce them to migrate, for the purpose of seeking quiet in the higher portions of the intestines.

When, by the symptoms which have been previously described, a child is observed to be affected with the *Ascarides vermiculares*, the treatment had better be commenced with a dose of aloes, or aloes combined with calomel, given in such strength as to open the bowels freely. The aloes, from exerting its powers more especially on the lower portion of the intestinal canal, induces an increased propulsion in that part, and frequently is itself sufficient for the expulsion of the animalculæ. It is, probably, only in this way that it acts when administered in the form of a clyster; the experiments instituted by Redi appearing to demonstrate that it is not a virulent poison to the *entozoa*. - After the bowels have been freely evacuated, clysters of a strong solution of salt in water, of the decoction of the *Se-*

mina santonicæ, the sulphate of iron, or lime-water, administered cold—or, what is still better, of the oil of turpentine—should be recommended. The daily use of one or other of these clysters, with the exhibition of a cathartic twice a week, will generally rid the intestines of their unpleasant occupants; after which their regeneration must be prevented by the employment of tonics, and by avoiding the predisponent causes before enumerated. Occasionally, however, these animalculæ are so gregariously involved amongst each other, and so covered with the intestinal mucus, that none of the ordinary remedies, though assiduously and judiciously employed, can encompass their destruction and expulsion. It is on this account that Dr. Howison has been induced to recommend, more especially in adults, that the patient's middle finger, smeared with lard, should be introduced as far as possible into the rectum, and the *Oxyures* contained in the lower portion of the gut be rubbed from the surface to which they are applied, and then, as it were, scooped out from the rectum*. In

* *Edinburgh Medical and Surgical Journal*, No. 75, April, 1828.

children, this operation would be difficult of completion, but it rarely can be necessary; the *Oxyures* being generally either removed or considerably diminished in number by the means above mentioned. It not unfrequently happens, that children are so extremely restless that clysters cannot be administered to them. In such cases we must trust wholly to the use of cathartics, given twice a week; whilst the intermediate time is filled up by the regular exhibition of the *oleum terebinthinæ*, or the *semina santonicæ*, combined with the *pulvis stanni granulati*, in quantities proportioned to the age of the individual; every attention being at the same time paid to those means which are proper for invigorating the general habit, and the chylopoietic organs in particular.

The treatment of the *Ascarides lumbricoides* is subservient to the general principles inculcated in a former part of this section. As, however, their residence is commonly in a more elevated portion of the intestinal tube than that occupied by the *Oxyures vermiculares*, the use of clysters would be manifestly ineffectual. All

our dependance must therefore be placed upon those anthelminthics, aided by the use of the adjuvants, which have been previously recommended. It has been already stated that the only *Anthelmintica vera* which are worthy of retention in the catalogues of the Materia Medica, are, the *Semina santonicæ* and *Oleum Terebinthinæ;* and the *Dolichos pruriens* and *Pulvis Stanni*, amongst the *Anthelmintica mechanica.* On the two latter less dependance can be placed than on the former: they may, however, should it be considered advisable, be administered according to the rules laid down at p. 60—62. The *Semina santonicæ* may be exhibited in the dose of half a scruple to half a dram, twice a day, in treacle or any vehicle*, interposing twice a week, as in the case of the *Anthelmintica mechanica*, a dose of one of the cathartics previously recommended.

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* On prepare aussi, enfin, avec le *semen-contra*, des patisseries légères dont l'effet anthelmintique est presque toujours certain chez les enfans. On en fait aussi un sirop, un électuaire, une confection, une teinture, et cela sans affaiblir en aucune façon les vertus médicinales de cette substance.—H. Cloquet, *Libri citati*, p. 133.

The most powerful remedy, however, which we possess, in all cases of worms, is the *Oleum Terebinthinæ* under some of its forms. In this country it is generally given uncombined with other remedies, the whole dependance being placed upon it; but on the Continent it is more commonly united with animal oil, petroleum, &c. by which addition its virtues are considered to be increased. From half a dram to two drams may be given to children of three years of age, and the dose be diminished or augmented according to the age of the little patient. It may be exhibited in honey, sweetened milk, mucilage, cinnamon water, or syrup, morning and night; and be continued for some time after the evacuation of worms. Should it not produce any cathartic effect, one of the ordinary purgatives may be prescribed twice a week; and it would be well that its use should be premised by that of a cathartic.

The *Oleum Empyreumaticum Chaberti*, which is a compound of the oil of turpentine, was first recommended for the human subject by Bremser. It is prepared from one part of the fetid or empyreumatic oil of hartshorn and three of the

essential oil of turpentine. These are well mixed together and suffered to remain at rest for four days; after which they are distilled in a sand-bath until three-fourths of the liquor has passed over. This is directed to be kept in a bottle with a well-secured glass stopper, and to be preserved from the rays of light. The following is the mode of treatment which Bremser employs against the different species of worms, especially the *Tænia solium*, occurring in adults; the first step being the same which Frank* has adopted for the last thirty years, with the most decided advantage.

He commences with the following electuary:

℞ Seminum Cinæ (Santonicæ) aut Tanaceti vulgaris, ruditer contusorum, ℥ss.
Pulveris radicis Valerianæ sylvestris, ʒij.
——— Jalapæ, ʒss vel ϑij.
Potassæ Sulphatis, ʒiss vel ʒij.
Oxymellis Scillæ, q. s. ut fiat Electuarium.

The patient is recommended to take two tea-spoonfuls of this remedy twice or thrice a day until the whole is consumed.

When this is finished, he gives, morning and

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* *Libri citati*, p. 290.

evening, two dessert spoonfuls of the empyreumatic oil, and directs the mouth to be rinsed afterwards with a little water*. Should the oil act too powerfully on the nervous system, or on the bladder, the dose must be diminished. According to this plan, about two ounces and a half will be taken in the space of ten or twelve days. The following purgative is then exhibited:

℞ Pulver. radicis Jalapæ, ℈j.
Folior. Sennæ, ʒss.
Potassæ Sulphatis, ʒj. Misce.

This powder is directed to be taken every hour until full evacuations are produced; after which the oil must be again resumed, and persisted in until four, five, six, and even eight, ounces shall have been taken, according to the difficulty which may be experienced in expelling the *Tænia* or other *Entozoa*. Bremser confesses that this treatment is somewhat protracted; but he affirms that it is certain, free from danger, and that, by

* Ac, ne quid hujus olei in faucibus hærescat, pauculum aquæ desuper bibitur.—FRANK, *Lib. cit.* p. 290.

following the rules inculcated, there is never need of any secondary treatment*.

When, however, a marked disposition to the generation of worms exists, he recommends the use of the following drops:

℞. Tinct. Aloes Comp. ʒj.
—— Ferri Pomati† ℥j.
Elixir. Vitriol. ℥ss. M.

Ten, twenty, or thirty drops of this mixture may be given three or four times a day in a glass of wine or water.

The above is the treatment generally pursued, by the celebrated Helminthologist above alluded to, in cases of the *Ascarides lumbricoides* and *Tæniæ*, especially of the latter, when infesting the adult frame. To the younger portion of

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* Nullam quidem, observata hac methodo, *curam*, ut vocant, *secundariam* requiri, hic idem asserit.—Frank, *Lib. cit.* p. 291.

† The *Tinctura Ferri Pomati* of the Berlin Pharmacopœia is thus formed:

℞. Ferri rubig. in pulv. trit. ℔j.
Succi malorum acerb. ℔iv.

Macera per dies quosdam, et, lento igne, consume donee crassitudinem extracti habeat. Hujusæ extracti uncias duas in aquæ cinnamomi spirituosæ octariis duobus liqua.—*Conspectus de Pharmacopées de Dublin*, &c. p. 489.

mankind it may also be appropriated, by a proper regulation of the doses. The great objection, however, to these, as well as to all other terebinthinate remedies, is, the difficulty of inducing children of a tender age to swallow them. This difficulty may, however, be frequently overcome; admixture with honey, sweetened milk, &c. considerably shielding their nauseous flavour. The same objection is also applicable to all those remedies which seem unequivocally to possess any influence over entozoic existence, and especially to those which are the most energetic. Bremser considers that some vermifuge property resides in the animal oil which is combined with the oil of turpentine to form Chabert's empyreumatic oil; nor does this seem improbable. Rudolphi* asserts that he has frequently employed *Dippel's animal oil*, which is nothing more than the oil of hartshorn, with advantage, in the dose of from three to ten drops, three times a day, to adults. The simple oil of turpentine will, however, be generally found sufficiently successful,

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* *Libro citato.*

if administered in the manner, and with the adjuvants, before mentioned.

Where there is reason to suspect the presence, in the intestinal canal, of any adventitious *Entozoa*, as of those to which Dr. Good has assigned the term *Helminthia erratica*, their treatment will fall under the general principles which have been already inculcated.

CHAPTER II.

OF CONSTIPATION.

One of the earliest derangements to which the infantile frame is liable, may be considered as a variety of constipation. I allude to the retention of that black and tenacious matter usually passed by the infant during the first two or three days of its existence, to which the term *meconium* has been applied. This substance occasionally adheres with so much pertinacity to the parietes of the intestines, as to resist the most energetic purgatives; whilst, at other times, one portion is evacuated, and the remainder retained for a longer or shorter period, giving rise to symptoms of considerable intestinal disorder.

Of the uses of the meconium, or whether it be convertible into any use in the animal economy, physiologists are by no means agreed; the most general opinion is, and it certainly carries with it the greatest appearance of proba-

bility, that it is a mere excrementitious mass, produced by an accumulation of the intestinal mucus secreted by the mucous coat of the intestines during the course of gestation, united, according to the experiments of Vauquelin and Bouillon-Lagrange*, with some portion of bile.

Whatever may be the use of this substance during the fœtal state, its excretion soon after birth is of the utmost importance; as its presence in the intestinal canal must interfere with the proper assimilation of the nutriment taken by the infant; and not only so, but it is found to give occasion to tormina, flatulence, and other symptoms of irritation. Whenever, therefore, an infant, some days after birth, is observed to be affected with these symptoms, it is not unlikely that they may have been produced by a retention of some portion of the meconium, although a lapse of time may have occurred sufficient to render it probable that the whole had been discharged.

In general, the best remedy for expelling the meconium, is the *colostrum*, or first milk of the mother; many infants require nothing more: in

* *Annales de Chimie*, t. lxxxvi, p. 291.

others, however, it becomes necessary to have recourse to other means, either from the failure of the colostrum in producing the evacuation, or from its not acting with sufficient promptitude by reason of the torpor of the intestinal tube.

Generally, a few grains of rhubarb, or a teaspoonful of the oleum ricini, or of the syrupus rosæ, is sufficient for the expulsion of this substance. A common application with the nurses, is a piece of butter and soft sugar mixed together, which generally answers the purpose sufficiently well. Occasionally, however, these milder means fail; the child has no evacuation for twelve or twenty-four hours after birth, and exhibits considerable signs of intestinal uneasiness. Under these circumstances, the use of the remedies previously mentioned, may be aided by the exhibition of a laxative clyster, repeated as occasion may require; or, what will be found equally efficacious, by the introduction of a small suppository, formed of yellow soap. This will be frequently found to succeed when the clysters have failed; and it is not amenable to an objection which applies to the use of clysters in children; viz. that they are liable, in careless hands, to be

given at too high a temperature, and thus to be productive of fresh mischief. In obstinate cases of this affection, more dependance may be placed upon cathartic or irritating substances introduced *per anum*, from the circumstance that where an opportunity has been afforded of inspecting children who had died a short time before or after birth, the meconium has been found to occupy the great intestines only; the small intestines merely containing a light-coloured bilious fluid, mixed with a little gastric juice. Nothing but mischief can arise from the retention of the meconium; and when milder means fail in expelling it, more energetic must be had recourse to. The bowels of children are so copiously lined with mucus, that purgatives, which would act in a powerful manner on the adult, frequently pass through the intestinal tube of the infant, without occasioning any increased secretion from its internal surface, or augmented action of the muscular tunic.

According to Tissot*, a spasm of the sphincter ani, is not unfrequently the cause of retention

* GARDIEN, *Traité Complet d'Accouchemens*, &c. vol. iv. p. 87.

of the meconium ; in these cases, he considers purgatives to be improper, and recommends the use of emollient fomentations, the warm baths, &c. but it is very doubtful whether these ideas have any foundation in fact. Constipation in some infants is an hereditary affection, and is, of course, in such cases, natural to the child ; but although, when it does not exceed proper bounds, it may not require the use of any remedy ; yet, when the health begins to suffer, or colic, flatulence, &c. shew that it is proceeding to an injurious extent, it ought to be carefully attended to, as it may occasion convulsions, inflammation of the bowels, or other serious mischief. Where the predisposition has descended from a mother of the same habit, the tendency to it cannot be removed by the exhibition of any remedy to the child ; the constipation may be temporarily obviated, but it will always recur. Under such circumstances, where practicable, the milk should be changed ; and, if it can be accomplished, the change should be made for that which is not so old. In young females, however, it becomes a matter of considerable importance that they should suckle their infants, in order to prevent the too rapid succession of chil-

dren. In those cases, the only thing to be done is for the mother to have recourse occasionally to a brisk purgative, to alter, if possible, the quality of the milk ; to let her diet consist of those substances which have an aperient tendency ; and to take, habitually, small doses of some saline aperient. The infant should also be occasionally fed on arrow root, veal soup, barley-meal porridge, water or beer sweetened with brown sugar or treacle ; and castor oil, magnesia, syrup of roses, manna, or any mild purgative, may be occasionally exhibited.

When habitual constipation does not appear to be hereditary, but to originate from an accidental cause, it is more readily curable. If the child's food appears not to agree with it, the first thing to be done is to change the regimen. But if this be not sufficient to remove it, some tonic laxative may be exhibited, and here rhubarb is particularly advisable. Generally speaking, in children, costiveness arises from some torpor in the peristaltic action in the intestines, or from some want of tone, which the rhubarb, from its consecutively tonic action, is well adapted to remove.

When costiveness in children, at any age,

exists to a great degree, other and more varied purgatives become necessary. Senna, jalap, calomel, and scammony, alone, or in combination, may be exhibited ; but, should they not succeed after once or twice repetition, their administration had better be suspended, and the suppository above-mentioned, or a cathartic clyster, composed of aloes dissolved in gruel, be substituted occasionally. When these means have failed, the warm bath, or the application of leeches, has produced a salutary change in the condition of the intestinal tunics, and occasioned copious evacuations. A useful adjuvant will also be found in friction, either by the hand solely, or with the linimentum camphoræ on the abdomen or along the lumbar spine: it would seem occasionally to stimulate the nerves of the part, and to induce a new action in the intestines.

In some very obstinate cases, I have found the administration of aloes in powder succeed in emptying the intestines, where all the common remedies had been ineffectually employed : it is indeed in such cases only, that its exhibition, to the extent which I have used it, can be justified.

I was first induced to employ this medicine so largely, from the very high eulogiums I had heard pronounced upon it by Dr. Hamilton, the present celebrated Professor of Midwifery in the University of Edinburgh, to whom the idea of administering it was suggested, by observing, in a laboratory where he had been placed by his father for the purpose of being instructed in Pharmacy, that the syrup of buckthorn (so called) which they were in the habit of vending to mothers of families to be given to their children, was usually formed extemporaneously of aloes dissolved in treacle; and upon making inquiries of those who had purchased it, he found that no bad effects had resulted from its administration. He consequently formed the determination of trying it in his own practice; when he found it to be not only a successful agent when other means had failed, but also that it was rarely rejected by the stomach, acted mildly, was perfectly safe, and but seldom objected to by young infants. To older children, however, in whom the taste generally becomes exquisitely sensible, the last observation does not generally apply. In all the encomiums passed upon the use

of aloes as a purgative, I can cordially concur. In some cases of constipation and in others of diarrhœa, apparently occasioned by the retention of feculent matter in the upper portion of the intestines, I have seen its administration productive of the most happy effects. It has been but rarely objected to by children; and its use has never, to my knowledge, been attended with griping or any other unpleasant symptom.

Master B. of Bromley, aged twelve months, after a constipation of two days' duration, was attacked on the first of August, 1819, with violent sickness and vomiting, accompanied with considerable pyrexia; the abdomen was tense and full, notwithstanding a purging of a watery nature, unmixed with feculent matter. Four grains of scammony and two of calomel were given every four hours, with the following mixture:

℞ Infusi Sennæ, ℥iss.
Tinct. ejusdem,
Syrup Rhamni, } āā ℥i.
Sp. Ammon. Arom. gtt. v.—Fiat mistura cujus sumatur pars quarta singuliscum pulveribus.

On the next day, the symptoms continued in about the same state, except the vomiting and

purging, which had nearly ceased. The medicines were therefore ordered to be repeated. On the third, the symptoms were much the same. The medicines had been regularly continued, but they had not produced any feculent evacuation. A cathartic clyster was now directed to be exhibited night and morning, and a grain of calomel with four grains of jalap substituted, four times a day, for the powders first prescribed.

On the fourth, the symptoms still persisted much in the same state. Two enemata had been administered, and retained each for the space of twenty minutes; but they brought nothing away, except a little mucus from the lower part of the intestinal canal. No evacuation had been produced by the medicines. The clysters were ordered to be continued, and four grains of scammony, with two of jalap, ordered every four hours, along with a mixture of infusion of senna and tincture of jalap. On the fifth, no evacuation of feculent matter had been produced by the clyster or medicines, although they were all retained; the symptoms of pyrexia were somewhat augmented; the child felt a great disinclination to be moved, and the fulness of the belly

was very considerable. A dram of aloes was now directed to be dissolved in an ounce of simple syrup, and a tea-spoonful ordered to be given every two hours, along with one of the powders last ordered.

On the seventh, the whole of the syrup had been taken and retained; and he had this day the first feculent motion since the commencement of his illness. The fulness of the abdomen was somewhat diminished, but the febrile symptoms remained in much the same condition. The aloetic mixture and powders were ordered to be carefully continued.

On the following day he had two copious, feculent, motions, which considerably reduced the fever; the abdomen became less full, and the child seemed considerably improved. The aloes was now ordered to be laid aside, and half a grain of calomel directed to be given four times a day, along with an aperient mixture. Under the continuance of this plan, he became gradually convalescent.

This patient, it will be remarked, took two drams of the powdered aloes in two days, without any griping or unpleasant symptom occur-

ring which could be considered as fairly referrible to that medicine.

Another child, six months of age, similarly affected, in which the usual routine of purgatives had been unavailingly administered, took two drams of aloes in two successive days before the bowels were opened ; after which, evacuations were produced, and it did well : whilst another of the same age, and labouring under the like symptoms, required three drams, taken in three days, to produce the same effects.

In these three cases, which occurred about the same period, the remedy was exhibited to a greater extent than in any others which have fallen under my care ; but I have frequently administered it satisfactorily in doses of a lesser magnitude. My friend, Mr. Robinson, of Great Prescot Street, a practitioner of considerable talents and discrimination, has also communicated to me some cases in which it was given in as large doses, and attended with equally agreeable results. Whether it is that the syrup with which it is combined in some measure shields the intestines from its irritating action ; or that the mucus with which the intestines of children

are plentifully covered, acts in the same manner, it is difficult to determine ; probably both one and the other exert a similar agency.

In the minds of several practitioners, an objection has been raised to the use of all drastics in constipation and other diseases of children ; and there can be no question but that they should not be had recourse to until after the failure of the milder means. The objection, however, in many cases, appears to arise more from theoretical deduction than from any bad effects which have been really observed consequent on their use ; the unpleasant symptoms being more frequently occasioned by the disease than by the remedy. The second of those modifying causes mentioned towards the conclusion of the last paragraph, generally possesses agency sufficient to prevent any bad effects on the intestinal tunics ; but where there is much pyrexia, accompanied with marks of inflammatory action, as denoted by tenderness of the abdomen, combined with costiveness, those purgatives had better be administered which are known to be mild in their operation and not likely to adhere to, and thus cause increased excitement in, the mucous coat

of the intestines. Of these, the oleum ricini is perhaps the most eligible; and where this is not successful in removing the obstruction, cathartic clysters will generally effect a cure.

To calomel, also, some individuals strongly object, in the constipation of infants—from salivation having been occasionally induced by it. This is, however, so rare an occurrence, that I have myself never witnessed such an instance under the age of two years; and the late Dr. Clarke, whose experience was most extensive and diversified, has remarked that under various circumstances he had prescribed mercury, in very large quantities, and in a great number of cases; but that he never produced salivation, except in three instances, in any child under three years of age*. Where such cases do occur, they ought to be ascribed to some particular idiosyncrasy or susceptibility in the individuals, and only to be esteemed exceptions to a general rule. I have administered calomel freely in infantile diseases, and can safely assert, from the results of such practice, that it is a safe and efficacious purgative,

* *Commentaries on the Diseases of Children*, p. 182.

and one of the most valuable which we possess, owing to the smallness of the bulk in which it may be exhibited, and in the absence in it of any disagreeable flavour. After three years of age, its repeated administration cannot be so freely indulged as previously; but when joined with rhubarb, jalap, or scammony, it forms compounds of considerable energy, on the administration of which, singly or alternately, conjoined, if necessary, with infusion of senna, and cathartic clysters, we generally place our confidence. Oils have been objected to by Underwood* and Peyrihle†, from an impression that they are productive of indigestion or flatulence. This is, however, a consideration of but little moment: if they succeed in removing the obstruction, the flatulence is easily remedied by the means which will be hereafter mentioned.

M. Jadelot‡, Physician to the *Hôpital des Enfans* of Paris, one of the most extensive schools for the observance of the diseases of

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* *A Treatise on the Diseases of Children*, vol. i. p. 21.

† Gardien, *Libro citato.*

‡ De Salle, *Traité des Maladies des Enfans*, de Michael Underwood, 1e Partie, p. 203.

childhood in the universe, is in the habit of employing the following purgative, which he asserts "*ne manque jamais son effet*"! These sweeping affirmations, however, must be received *cum grano salis*, and merely as testimonies that it has been generally found effective. Neither this nor any other formula will be found to succeed universally: but it may be advantageously employed in alternation with the other means which have been previously mentioned.

℞ Fol. Sennæ, ʒiij.
Sodæ Sulphatis, ʒij.
Mannæ, ℥j.
Aquæ, ℥iv.

Sennam in aquâ bulliente per horæ quadrantem infunde, tum cola et adde Salem et Mannam.

A spoonful of this mixture is administered repeatedly, until evacuations are produced.

When the state of constipation has once been removed, its recurrence must be obviated by proper attention. For this purpose, the use of the cathartics had better be gradually discontinued; and, especially if there be any hereditary predisposition to the affection, the use of aperient food, where the child is too old to be at the breast, should be inculcated: such as arrow-root sweet-

ened with brown sugar or treacle, or beer edulcorated with the same materials. Where the child is at the breast, the diet of the mother and child must be regulated as has been previously recommended.

Where, along with constipation, children are affected with languor, yellowness of the eyes and skin, high-coloured state of urine, and a clayey condition of the alvine evacuations, in addition to purgatives, the food must be regulated, bitter remedies ordered, and warm fomentations or frictions applied to the abdomen every night.

CHAPTER III.

OF ACIDITY, FLATULENCE, AND COLIC.

Acidity, flatulence, and colic, being frequently links in the same chain of causation, their consideration will fall very properly under one head.

Colic, under the denomination of wind or gripes, is one of the most common disorders of infants, and occasions more varied distress at this early period of life than any derangement to which they are subjected. The complaint generally, if not universally, is occasioned by acidity or flatulence*, and consequently the attention of

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* Harris goes so far as to ascribe not only this but every other affection of infants to the predominance of acid. "Omnes causæ" inquit "ægritudinum infantilium antecedentes et mediatæ, quotcunque reverà fuerint, aut excogitari potuerint, in unâ causâ proximâ et immediatâ tandem coalescunt, nimirùm in *acido* longè latèque præpollenti."—*De Morbis acutis Infantum*, edit. 3tia. p. 22.

the practitioner must be directed, so soon as the paroxysm has terminated, to those functional aberrations on which the formation of acidity and flatus is dependant. These aberrations consist in torpor of the digestive organs: the food not being properly digested in the stomach, but, on the contrary, undergoing fermentation, and thus occasioning considerable acidity and the disengagement of aeriform fluid. In this state of torpor the intestinal tube generally participates; and, until its peristaltic action is increased by means hereafter to be mentioned, and the offending cause removed, the infant is subjected to that derangement which has usually been termed colic.

It is a common idea amongst females in several parts of the Continent, that in an inverse proportion to the deficiency of after-pains in the female, is the child subsequently afflicted with colic*: but this idea is so absurd that it is scarcely worth mentioning, except that it is apt to render females inattentive to the use of proper means, from a feeling that the complaint is owing to a cause which is unalterable.

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* GARDIEN, *Loco citato.*

The principal exciting causes of acidity and flatulence, are, exposure to cold, especially of the child's feet; improper food; irregularities in the diet of the nurse, or the bad quality of her milk; the custom of giving the breast too frequently to children; and, in short, any thing which may cause imperfect digestion, or atony of the intestinal canal.

Colic is generally more common during the first six weeks of existence; but, not unfrequently, the disposition to it continues to the tenth or twelfth month, and later. It commonly makes its attack suddenly, is known by hardness of the abdominal muscles, kicking and drawing up of the legs, and is frequently attended with suppression of urine.

Colic is usually accompanied by diarrhœa, or constipation. When an infant labouring under the disease is confined in its bowels, there is reason to believe either that the complaint is occasioned by flatulence or by the retention of some saburral matter. These cases are more dangerous than when moderate diarrhœa is a concomitant, and, when the symptoms run high, especially if any pyrexia be present, require topical bleeding,

cathartics and cathartic clysters, warm bathing or warm fomentations to the belly, and friction with the linimentum saponis to which a fourth part of the tinctura opii has been added. M. Alphonse Leroy has recommended, in those cases, the exposure of the child's belly to a flaming fire, and rubbing it with warm flannels; both of which, of course, act on the principle of common fomentations; viz. by the heat which they communicate. The reasoning, however, if the term reasoning can be applied to such unphilosophical jargon, which he, as well as a modern writer of some eminence on the diseases of childhood, has adopted in explaining the advantages to be derived from exposure to the *feu flamboyant*, is most extraordinary; a considerable portion of the good effects, according to these worthies, being referrible to the influence of the light, or, in other words, that heat without flame would not be productive of so much benefit*.

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* "On peut assimiler en quelque sorte les effets que produit dans l'economie un feu qui fournit une belle flamme, à ceux que produit, dans cette même économie, l'influence bénigne du soleil, dont les médecins ont reconnu, depuis quelque temps, les effets salutaires dans toutes les maladies où

In slight cases of colic, however, occasioned by flatulence, the opiate friction, with any of the ordinary carminatives, as a drop or two of the essential oil of aniseed, caraway, or peppermint, by stimulating the stomach and increasing the peristaltic action of the intestines, will expel the flatus and thus afford relief. But where it originates from acidity, as may be partly recognised by the bowels not being confined and the motions possessing a green colour and sour smell, in addition to the above "peristaltic persuaders," the exhibition of magnesia will correct the acidity, and aid the expulsion of the offending matter from the bowels. For this latter purpose, it may be occasionally necessary to use a suppository where the infant is suffering much from pain.

During a paroxysm of pain, a child will frequently refuse the breast, although offered it repeatedly, when placed in the usual manner on the nurse's arm, but will take it very readily if it be held upright before her. The reason of

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il existe débilité : une chaleur portée au même degré, mais sans l'influence de la lumière, ne produit pas cet effet vivifiant." —GARDIEN, *Traité complet d'Accouchemens,* vol. iv. p. 193. Paris, 1816.

this, Dr. Underwood* considers, may perhaps be, that the offensive and irritating matters in the stomach then descend from the cardia, which is exceedingly sensible, from its numerous nerves. As, however, tormina are usually seated in the intestines, this explanation does not seem very philosophical. During their existence, sometimes one position relieves, and sometimes another. Frequently the child is easiest when lying on the belly: but as the relief obtained by posture is, in all probability, different according to the precise part of the intestines in which the irritating matter is contained, no precise position can be recommended suitable to every case.

When the paroxysm has been removed, the remaining indication consists in removing the cause, and thus preventing its recurrence. For this purpose, it is necessary to attend, not only to the child, but also to the nurse. Where the nurse is regular in her diet, and her milk seems good, especially if the child be of a fat and flabby make, there is reason to believe that a great portion, if not the whole, of the evil resides in the

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* *Libro citato.*

latter; and the means must consequently be more especially directed to it, whilst at the same time the diet of the nurse may be so regulated as to assist in this object.

Where there is a tendency either to acidity or flatulence, the same prophylactic treatment is necessary; as both the one and the other are dependant upon deficient action of the digestive organs. A little magnesia may every now and then be administered; the preparations of cinchona, especially the watery infusion or syrup; or very mild doses of the alkaline base of that bark, as of the syrup of quinine, or of the infusion of calumba, or of gentian, may be exhibited. An excellent remedy, however, is contained in the infusion of rhubarb, in regulated doses, given so as to keep the bowels gently open, whilst at the same time it communicates tone to the stomach and bowels, and increases the peristaltic action. The child should be kept warm, and a flannel roller be applied round the abdomen, which gives support to the muscles, and is a valuable auxiliary in diseased conditions of the intestinal canal.

Where the child is at the breast, considerable

attention must be given to the diet of the nurse. If she have been irregular in her living, the cause of the child's complaint may be wholly centered in her; or, whilst living with the utmost regularity, her milk may prove flatulent or difficult of digestion. Porter, acids, and acescents, have been found, in many instances, to be the manifest cause of the mischief; all the symptoms having disappeared immediately on their ablation*. They should therefore be interdicted, and a little wine and water, or weak spirit and water, be substituted. She should also take, occasionally, some absorbent laxatives, as magnesia, and avoid as much as possible every thing which she has found to disorder her digestive organs. Where there is reason to suppose that the child's food is not proper for it, it had better be kept solely on the breast milk for a time.

Professor Gardien recommends that the diet of those children which are subject to colicky complaints, should consist of a *bouillie* formed

* HAMILTON, *Libro citato.*

of well-torrefied flour. Under the use of this food, he has found the gripings and green colour of the excretions gradually disappear*. It is an article of diet much used in this country for children in a state of health, and in general agrees very well with them.

Occasionally children are attacked with very violent pain in the bowels, which is much increased when they are moved; the least change of posture appearing to give inexpressible torment. Although this affection considerably simulates abdominal inflammation, it is generally dependant upon flatulence, combined with some temporary obstruction of the bowels; and is removed so soon as these are acted upon. Friction with the warm hand, or with some stimulating liniment, also affords considerable relief.

Where colic occurs in a child of older growth, it will be generally found dependant upon im-

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* "J'ai experimenté plusieurs fois que les tranchées et couleur verte des excrétions ont disparu par l'usage seul de la bouillie, chez les enfans qui n'en usoient pas auparavant."—GARDIEN, *Libro citato*, p. 194.

proper food having been taken; the removal of which, by any common purgative, will usually effect a cure. Its recurrence must then be prevented by attending to the principles already inculcated.

CHAPTER IV.

DIARRHŒA.

PERHAPS, without any exception, diarrhœa, under some of its forms, is the most common complaint incidental to childhood: the irritable habit of the infant, the variety of causes hereafter to be mentioned to which it is subjected, not only within itself, but extraneously, render it extremely prone to this complaint; whilst the older child, from greater liability to exposure to cold, and to indigestible food, is not less frequently attacked with it.

Whilst the child is at the breast, the colour of the motions is commonly that of a bright orange; the consistence pulpy and curdled, and the smell not offensive. During this period it has usually from two to four motions, or more, in the course of the twenty-four hours. At an after period, however, whether or not it may

have been permitted the use of meat, the stools are of a more brownish yellow colour, greater consistence, and of an offensive, but healthy, smell, which must be familiar to every one.

During the infantile state, it scarcely happens that any child escapes without having an attack of more or less mild diarrhœa, in which the stools are of a light green colour, and of a sour smell; but this is so easily corrected, as scarcely to require any attention. It evidently arises from impaired digestion, and the consequent formation of acid, which stimulates the mucous membrane of the intestines and occasions the preternatural discharge from the bowels.

Considerable attention must be paid to the appearance of the evacuations in diarrhœa, which are but rarely healthy and natural, and have been usually distinguished into the sour and curdled, slimy, mucous, green, pale, clayey, watery, and bloody; some of which, especially the three last, are now and then extremely fetid*. From the precise appearance of these, a good or bad prognosis has been deduced: but although

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* Underwood, *Libri citati*, p. 116.

this circumstance may inflect us considerably in the formation of our opinion, the degree of danger is more to be drawn from the state of the concomitant symptoms than from the dejections themselves. "Diarrhœa," as Mr. Burns has correctly observed*, "appears under various circumstances, not only with regard to the nature of the stools, but their frequency, the pain which attends them, the character of the complaint, and the effect on other parts. In some cases the stools are extremely frequent and uniformly so. In others, the dejections come in paroxysms, being worse either through the night or through the day. Some children are greatly griped; others are sick, oppressed, and do not cry, but moan. In severe cases, the stomach is very irritable, rejecting the food; but it is not equally so in every stage of the disease, though the stools be the same in frequency. The appetite is more or less impaired, and in bad cases the aliment quickly passes off; and every time the child drinks, it is excited to purge. The mouth, in obstinate bowel complaints, generally becomes

* *Principles of Midwifery*, &c. p. 576.

aphthous, and the anus excoriated or tender; and it is not uncommon for the feet to swell. Sometimes the child is flushed at certain times of the day, or the face is uniformly pale, and the skin waxy in appearance. In general, if the disease be severe, a considerable degree of fever attends it; and a continued fever in this disease is always unfavourable. The stools may come away with much noise from wind, or may be passed as in health. When there is great irritation, they are either squirted out forcibly, or come in small quantity, with much pressing. Diarrhœa sometimes proves fatal in forty-eight hours; but it may be protracted for several weeks, as is often the case when intussusception has taken place*. In such protracted cases, the emaciation is prodigious, the face is lank, the eyes sunk, and the expression anxious: the strength gradually sinks, the eyes become covered with a glossy

* This observation of Mr. Burns is extremely questionable. When intussusception has once taken place, it is not probable that the disease is ever very considerably protracted. The constant state of irritation kept up in the mucous membrane, with the obstruction of the bowels, generally occasions so much organic mischief, as to speedily draw on a fatal termination.

crust, the extremities cold, the respiration heaving, and the child dies completely exhausted."

One of the most dangerous varieties of diarrhœa, is that to which the rude term of *watery gripes* has been commonly given, "non ex rei essentiâ cui primum et maximè medemur, sed ex eo quod forte primum occurreret." Underwood* has included this severe form under the term "Lientery *or* Watery Gripes;" but these terms are by no means synonymous; for although the food or drink rapidly passes through the little sufferer, it appears generally to have undergone some change; and, as Dr. Hamilton very properly observes, resembles moss-water†. From the first moment of the commencement of this variety, the stools are very watery and frequent; the child is extremely restless; the skin dry; the features very soon become pinched; the emaciation and prostration of strength are excessive; and if the disease be not speedily put a stop to it soon terminates fatally.

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* *Libri citati*, vol. i. p. 124.

† *Libri citati*, p. 65.

M. de Salle, in his French edition of Underwood, to which we have before referred*, has given the name of *Maladie de Cruveilhier* (although it distinctly resembles in its symptoms the *weaning brash* described by Dr. Cheyne) to a variety of chronic diarrhœa which reigned epidemically in France, and in which the principal circumstance worthy of attention, was, that on the examination of those who died, as will be hereafter mentioned, a gelatinous disorganization, with or without perforation of the stomach, and small or large intestines, was met with. A careful comparison of the symptoms of this variety, with the morbid appearances which presented themselves after death, and the means of cure found most efficacious, the only sure mode of improving our therapeutics, may aid us in the diagnosis and treatment of other forms of diarrhœa.

On the application of any of the ordinary causes, says M. Cruveilhier, who first described it, the digestion becomes impaired, and a diarrhœa supervenes, which rapidly augments. The

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* *Libri citati*, p. 236.

child perceptibly wastes away, becomes fretful, capricious, and is desirous of always having the breast. Should it be weaned, it is voracious after the drink presented to it. This excessive thirst is said to be the most characteristic symptom of the first period of the disease.

" The first stage may persist from eight days to two months. The second continues from three to fifteen days. It commences almost always by nausea or by continual vomiting, with a cough *avec regurgitation*, as in hooping cough. When the seat of the disease is confined to the intestines, the stools become always more frequent, assume a putrid smell, are green, and similar to chopped grass. The colour indicates the secretion of a large quantity of bile, as the food stays so short a time in the intestinal canal, that it could not be so much impregnated with it, did it only flow in its ordinary quantity*.

Frequently after repeated vomiting, the child

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* " Cette teinture indique la sécrétion d'une grande quantité de bile de cette couleur: car les alimens séjournent trop peu dans le canal intestinal, pour s'en imprégner suffisamment, si elle ne coulait qu'en sa quantité ordinaire."—De Salle, *Lib. cit.* p. 246.

becomes cold and falls into a sort of syncope. The pulse is slow and irregular, both in frequency and strength ; the extremities are cold, and the intellectual faculties in the most perfect state of integrity, a condition which they retain until the last moment ; the child is excessively peevish; every thing, even looking at it, distresses it. It is extremely restless, and unable to hold up its head. Subsequently, stupor occurs ; cadaverous countenance ; eyes half closed and turned upwards ; sometimes slightly open and fixed ; grinding of the teeth ; increasing cold over the whole surface of the body, and especially of the extremities ; emaciation extending to the highest degree in the space of twenty-four or forty-eight hours. Finally, after appearing to be better for half a day, a whole day, and sometimes for several days, the dangerous symptoms augment, and the child sometimes succumbs after a violent crisis; at others in a gradual manner."

On the dissection of those who have died of diarrhœa under its different forms, a variety of appearances have presented themselves. Generally, the mucous membrane has been found in-

flamed, or, at least, there have been signs of the existence of previous inflammation in some portion of the digestive tube; but, occasionally, fatal diarrhœa has occurred without there being any evidence of such a morbid condition.

M. Andral, a very attentive investigator of pathological anatomy, has lately published some very interesting observations on the state of the mucous membrane of the intestines in the different varieties of diarrhœa, which add very considerably to our knowledge of the subject, and from which I shall take the liberty of gleaning.

Diarrhœa, dysentery, and lientery, all of which may, however, be incorporated together, were, for a long period, regarded as diseases entirely independent of inflammation of the intestines. Many writers of antiquity have referred to ulcerations occurring at the internal surface of the intestines in chronic diarrhœa; but these ulcerations were considered more as the effect than the cause of the disease. This was the opinion of Boerhaave, Van Swieten, and Stoll. Hippocrates was also aware of the existence of ulcerations in dysentery; but he regarded them as the effect of morbid bile and phlegm.

The numerous researches of the moderns have thrown considerable light on the subject; but they have, perhaps, occasionally induced sentiments of an opposite extreme, by giving rise to a belief, that every diarrhœa must be accompanied with inflammation. The following are the results of the frequent *post mortem* examinations which have fallen under the notice of M. Andral.

" I have several times found in individuals labouring under recent or chronic diarrhœa, the internal surface of the intestinal canal very pale in its whole extent; the mucous coat being of its usual consistence and thickness. Patients, debilitated by long organic diseases, hydropics, old people in that state of languor designated by the antients under the term cachexia, and who have died after having laboured for a longer or shorter period under considerable diarrhœa, frequently present this condition of the intestinal canal. Their stools are copious, very liquid, purely aqueous, and much exceeding the quantity of fluid taken in. Occasionally, in cases of this kind, I have found an extensive serous infiltration of the sub-mucous cellular tissue. Morgagni has

related several cases of diarrhœa without inflammation of the mucous coat: in those instances the patients sank in a short space of time, exhausted by the excessive quantity of their alvine evacuations.

" In such cases of atonic diarrhœa, the parietes of the intestines are frequently much extenuated, the fleshy tunic especially, which is found composed only of some pale and small fibres, widely separated from each other; a fact which Bonetus had remarked, as he says that, in chronic diarrhœa, the intestines are found as thin as a cobweb. In this condition, the intestine seems to be incapable of fulfilling its functions; chylification is imperfectly performed; absorption becomes much less active; and the food is frequently voided in the same state as when taken; constituting what the antients termed '*lientery*.'

" The mucous coat of the intestines may, therefore, like many other tissues, be the seat of a much more than ordinary secretion, although it presents no trace of inflammation. In like manner, during convalescence from chronic diseases, the exhalation of serum into the sub-cuta-

neous cellular tissue is augmented; and it was consequently not without reason that Sauvages designated a particular class of diseases under the name of flux.

" Since, then, there exist fluxes which are really atonic, it follows that a tonic and astringent treatment is, under those circumstances, the most proper; as we remove the œdema, of which we have just spoken, by the external employment of stimulating applications, or the internal administration of tonic medicines. In other individuals, the mucous coat is also found white in its whole extent; but beneath it, there exist numerous tubercles or other adventitious tissues*. These occasion diarrhœa, either by the sympathetic irritation produced in the mucous membrane covering them, or by their presence stimulating the muscular tunic, and occasioning more rapid and violent contractions; in the same manner as various accidental tissues arising in the parenchyma of the lungs provoke a constant irritation in the

* The term " *tissu accidentel,*" is used in French medical literature, to signify any new formation which has occurred as the result of a morbid process.

mucous membrane of the bronchi; but most commonly, the diarrhœa in such cases does not seem to become permanent and considerable until the softened tubercles inflame and occasion ulceration of the mucous membrane.

"There can be no doubt, however, that, in a very great majority of cases, the intestines of those labouring under diarrhœa, complicated or not with dysenteric symptoms, present evident marks of inflammation, which may be seated either in the small or large intestine. In the small intestine, it frequently exists only to the extent of a few fingers' breadth above the ileo-cæcal valve: at other times, a larger portion of the intestine is attacked with it, under the form either of a simple injection of the mucous coat, alteration of its texture, red or white *ramollissement*, or ulceration. Numerous cases have convinced me, that acute or chronic diarrhœa is the frequent result of isolated inflammation of the small intestine, without the large at all participating in it. This fact I dwell upon, because M. Broussais has laid it down, as a general principle, that inflammation of the small intestine is accom-

panied with constipation, and that diarrhœa only supervenes when such inflammation is complicated with inflammation of the colon. Of the three portions of the great intestine, the cæcum, in diarrhœa, most frequently presents one of the three degrees of inflammation; after the cæcum, the colon, and, finally, the rectum.

"Those symptoms which collectively constitute dysentery, are not connected with any particular state of the intestines. Tenesmus alone announces that the inflammation exists in the rectum. As for the bloody and slimy evacuations, they appear in individuals whose intestines exhibit lesions similar to those of other patients whose stools had been always purely watery. On one occasion I found a considerable number of ulcerations in the ascending colon, in a consumptive individual, who had been previously subject to diarrhœa, which had been removed for a considerable period before death, and an habitual state of constipation had supervened. This may frequently happen, as may be readily conceived, when the ulcerations are small, few, and neither their edges nor base inflamed. Like tubercles, in fact, they at such times merely induce diarrhœa by the sympathetic

irritation of the mucous coat surrounding them, or of the muscular tunic*."

On inspecting the bodies of those who have died whilst labouring under diarrhœa, it requires some care not to be deceived by the appearances which the mucous coat occasionally presents, even when perfectly healthy. Thus, in some cases, the mucous follicles, from being considerably developed, form an elevation possessing a central depression, which has induced pathologists of considerable eminence to pronounce the internal membrane ulcerated; but when this has been carefully separated from the muscular coat, no solution of continuity has been perceptible. The anatomical characters of inflammation of the digestive tube, are, by M. Andral, divided into three varieties. In the first there is simply a greater or less degree of injection of the mucous coat; in the second, a thickened, softened, or exanthematous alteration of its texture—a morbid condition which may or may not extend to the other tunics; and in the third, the mucous coat and subjacent tissues become disorganized and ulcerated.

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* *Clinique Medicale*, par M. ANDRAL, p. 428.

The second and third varieties are not so likely to be mistaken as the first.

" As sero-sanguineous engorgement of the lungs," says M. Andral, " which has supervened only during the latter periods of life, may be easily confounded with the first stage of pneumonia; so may the mechanical *stasis* of the blood in the mucous coat of the digestive organs, or beneath it, be mistaken for an inflammation of these parts. I shall endeavour to make some observations which may prevent us from committing a similar error. Whenever, a few hours before death, the return of the venous blood towards the right cavities of the heart has experienced considerable interruption, the parietes of the intestinal canal are found in several parts more or less injected. The obstacle to the return of the blood towards the heart, may be seated either in the heart itself or in the lungs. In either case, the blood, which no longer enters these two organs with facility, re-flows towards the liver, which becomes engorged in its turn, and is no longer able to admit that which is brought to it by the vena porta. The ramifications of this vein consequently remain filled,

whilst they at the same time receive a fresh quantity by the arteries until, and sometimes even after, death. Hence proceeds the injection of the parietes of the intestinal canal. This injection is more vivid and common than in any other part, either in consequence of the number and size of the vessels, or its vicinity to the liver, into which the greater portion of the blood received by the right side of the heart, even that which is brought to it by the vena cava superior, reflows and accumulates as in a reservoir. If, in fact, as I have seen done by M. Magendie, we inject sulphuric acid into the jugular vein of a living animal, the hepatic vessels will be found filled with coagulated blood. It is only when the engorgement of the right side of the heart and of the liver has reached to a very great extent, that the other parts are also found injected after death. At such times the skin is marbled with livid streaks; the membranes of the brain are of an intense red; the brain itself is covered with an infinite number of small red points; an enormous quantity of blood streams out from all the parenchymatous tissues; the intermuscular, sub-serous, and sub-arterial, cellular tissues, are overrun by

a multitude of small vascular ramifications, &c. But the purely mechanical injection of the intestinal parietes presents several degrees. In the mildest variety, the cellular tissue beneath the mucous coat is found overrun by large veins filled with black blood, which give to the stomach, when viewed internally, a marbled appearance, and, owing to their multiplied anastomoses, form numerous arborizations in the intestines: they exist in great quantities in the folds of the small intestines, which, being deeply situated in the concavity of the small pelvis, from their depending position, offer a fresh obstacle to the return of the blood. The first degree, consisting in an injection of the great vessels of the sub-mucous tissue, must not be confounded with the inflammatory injection which is seated in the vessels of the mucous membrane. But in the second degree, besides these veins gorged with blood, the cellular tissue presents a multitude of small, vascular, ramifications, extending, in several parts, to the mucous coat, which, at such times, presents, at greater or less distances, patches of a brownish red, formed by the agglomeration of numerous, almost capillary, vessels, strongly

injected. When less numerous, they form small, red, isolated, or united, points in the mucous coat; and when more so, long red or brown bands.

" Occasionally, effusions of blood, with or without injection of the mucous coat, are found in the cellular membrane.

" Lastly, in the highest degree of this mechanical injection, the mucous coat exhales blood at its free surface. This I have witnessed in several subjects. Boerhaave had already observed, that when the blood which returns from the intestines cannot pass through the vena porta, owing to its being obstructed, it flows into the intestines.

" This sanguineous exhalation, connected with interrupted circulation, is also observed in other parts. The tissue of the lung, the substance of the brain, and those parts of the skin which are deprived of epidermis, occasionally become the seat of it, in individuals labouring under aneurism of the heart. The bronchi are frequently filled with a bloody fluid during the last moments of the life of phthisical patients who have undergone a long agony.

" All these phenomena, which have presented themselves to my notice in the dead body, may be artificially produced in living animals. By slowly depriving them of life, their digestive tube, which is pale, or of a rosy white, in the ordinary state, is observed to become injected and considerably reddened. A vivid coloration of the intestines may be also obtained by tying the trunk of the vena porta. This fact was known in the time of Morgagni ; who relates, that, after the ligature of this vein, the intestines quickly acquire the colour of cochineal, and a sanguineous exhalation sometimes takes place at their internal surface.

" From the whole of the preceding facts, it results that, when any stimulus, applied to the intestines, has merely occasioned their injection, without their texture being altered, it is frequently difficult, and sometimes impossible, to distinguish this inflammatory injection from that which has been produced in a purely mechanical manner. It becomes, at such times, necessary to attend not only to the symptoms which have preceded, but even to the kind of, death ; to observe the state of the lungs, of the right side of the

heart, of the liver, and of the system of the vena porta; and after all, in many cases, we must be still compelled to remain in doubt.

"Neither must the redness, which is observed around the large veins distributed in the submucous tissue, be taken for a product of inflammation. This condition is almost constantly met with, when the dissection has not taken place until after twenty-four hours from the time of death. It is observed under the form of long and narrow bands, which follow the direction of the veins, and are the mechanical results of the transudation of the blood through the parietes of the veins. They may be produced by subjecting a stomach whose vessels are full of blood to putrefaction*."

Such is a summary of the results of M. Andral's pathological observations on the bodies of those who have died of the various species of diarrhœa.

In the epidemic diarrhœa observed by M. Cruveilhier, and referred to in a former part of this subject, that gentleman found, on dissection,

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* ANDRAL, *Libri citati*, p. 402.

a gelatinous (*gélatiniforme*) disorganization, and thickening of the coats of the intestine, both with and without perforation. Sometimes this was seated in the small intestine; at others, in the large; but almost always the stomach was observed to be affected at the same time, along with one or other of the intestines. M. Cruveilhier remarks, that in the part where the *ramollissement* was situated, there was no trace of inflammation, nor any alteration of its colour; but he afterwards mentions a black tint of the vessels surrounding the alteration, and occasionally communicating itself to the disorganized parts, and the contained fluids*. At the internal surface of the canal, he also found several projecting, irregular, thick, and, as it were, stamped patches. All these appearances, however, and especially the gelatinous disorganization, were, in all proba-

* "Il est a remarquer," dit M. CRUVEILHIER, "qu'au lieu du ramollissement on n'observe aucune trace d'inflammation; bien plus, aucune alteration de couleur. Cependant, quelques pages plus loin il note et explique par l'accumulation des particules brunes colorantes du sang, une teinte noire des vaisseaux qui environnent l'altération et qui se communique quelquefois aux parties désorganisées et aux liquides contenus." DE SALLE, *Lib. citat.* p. 248.

bility, the results of previous inflammation: the unquenchable thirst, with the restlessness, signs of continual pain and uneasiness, were strong evidences of the existence of such a condition, of which the *ramollissement* was probably a termination.

The same observations are applicable to the appearances observed by Dr. Cheyne, on the dissection of those who died of the "*weaning brash*," a disease characterized by almost exactly the same symptoms as those of the *Maladie de Cruveilhier*.

In every case the intestinal canal, from the stomach downwards, abounded with singular contractions; and had, in its course, one or more intussusceptions; the liver was exceedingly firm, larger than natural, and of a bright red colour; and the gall bladder, which was enlarged, contained a dark-green bile. In some dissections, the mesenteric glands were found swelled and inflamed: in others, however, they were scarcely enlarged, and had no appearance of inflammation. Dr. Cheyne concluded, from these appearances, that the disease was owing to an increased secretion of acrid bile, or rather to the morbid

state of the liver occasioning this; and that the extremely irritable condition of the whole abdominal viscera, marked by the spasmodic contractions, intussusceptions, &c. was occasioned by the presence and passage of this acrid excretion. It is not, however, by any means improbable, but that deranged states of the biliary system may be, and generally are, occasioned by a previous inflammation or irritable condition of the mucous coat of the intestine; any irritation in the digestive tube will occasion an increased flow of bile; and it is extremely doubtful whether any purgative has an effect on the biliary secretion, except indirectly, through the medium of the intestinal canal. It is a law in the animal economy, to which there are few, if any, exceptions, that secretions do not irritate the parts over which they have to pass, whilst those parts are healthy; but so soon as they become inflamed, the same fluid, which was previously bland and harmless, becomes the source of intense irritation.

One of the most important questions that arise out of the foregoing enumeration of the

principal morbid appearances which the mucous coat has exhibited in the various conditions of diarrhœa, is, whether we are able to judge of the existence or absence of inflammation, from the symptoms which present themselves ?

In several cases, as M. Andral has very properly observed, this is possible*. If a child be affected with pain in the abdomen, as indicated by continual restlessness; drawing up of the legs; screaming or moaning, especially if the pain be increased on pressure; if the skin be hot, and the pulse more than ordinarily frequent; if the stools be slimy, membranous, or bloody, we may be satisfied that the mucous membrane is more or less inflamed. By Pinel†, Broussais, and some others, it has been considered, that in all cases of diarrhœa, there must be phlegmasia of that membrane; but this is extremely doubtful. Any ir-

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* ANDRAL, *Libri citati*, p. 428.

† The "*Diarrhée catarrhale*" forms the twenty-sixth Genus of the Order "*Phlegmasies des Membranes muqueuses*," —Class "*Phlegmasies*" of this Nosologist.—*Nosographie Philosophique*, &c. tom. ii. p. 327. Edit. cinquième.

ritating substance in the intestines might occasion the effusion of a considerable portion of fluid without actual inflammation having taken place: and, as has been before observed, an immense discharge has been witnessed in several old people where there was not the least evidence of phlegmasia on dissection; and where, on the contrary, there were unequivocal signs of that debility of the exhalants which occasions anasarca and other passively dropsical affections.

Nothing, however, is more common than the absence of all kind of pain in cases where numerous ulcerations have covered the internal surface of the intestines; either of the ileum, cæcum, or colon; and, on the other hand, it is not unusual to find patients complain of acute pain in the abdomen, although the mucous coat of the intestines is, in all probability, not in the least inflamed. Tubercles in the intestines have formed, gone on increasing, and become broken down, without any pain having indicated their existence.

Neither is the character of the motions always a certain sign of the presence of inflammation. Evacuations of blood have frequently taken

place in individuals, the mucous coat of whose intestines has been found healthy after death*.

Watery evacuations, similar to water coloured yellow or green, occur in every morbid condition of the intestinal tube, both in cases where it is ulcerated and where its parietes are pale, thin, and œdematous.

Of the various causes which give rise to diarrhœa in the unweaned child, the us of spoon-meat is, perhaps, the most frequent: accordingly, it is found to arise most commonly soon after weaning, especially in an unfavourable season, as in the autumn; when the child has been deprived of a diet congenial with its nature, to one not so readily digestible. It is comparatively rare to witness severe cases of diarrhœa in those children which are entirely confined to the nourishment which they derive from the parent. So

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* Ces hémorrhagies passives sont analogues à celles qui ont lieu chez plusieurs hydropiques, à la face interne des membranes séreuses de la poitrine et de l'abdomen: elles sont semblable aux hémorrhagies dont la peau, le tissu cellulaire et les membranes synoviales, deviennent le siége chez les scorbutiques. *Clinique Medicale*, p. 429.

important an effect in the chain of causation had the change of diet above referred to, in the variety of the disease described by Dr. Cheyne, that it has received the name of *weaning brash;* and in that affection, described by M. Cruveilhier, to which we have before alluded, the same dietetic alteration was observed to be one of its most prevalent causes.

It may also be produced by the milk of the nurse not agreeing with the child, owing to its being too old, or changed by some emotion with which she has been impressed, or by some alteration which she has undergone in her sexual relations, or by improper food. It may likewise be occasioned by the irritation of teething, acting sympathetically on the mucous surface of the intestines, or by cold, suppressing, in all probability, the insensible perspiration, and occasioning a sympathetic inflammation of the mucous tunic. In older children, the causes are, generally, improper diet of some kind, especially of acescent fruits in their season; or, inordinate quantity of any food; suppressed perspiration; or moral emotions.

Previous constipation, by irritating the mu-

cous coat, or a delicate condition of the bowels natural to the individual, or too active purgatives, may likewise occasion diarrhœa in children of any age.

Redundancy, and improper quality of the bile, has, by many authors*, been considered to produce diarrhœa; but it is by no means established whether such redundancy ought not rather to be considered in the light of an effect than of a cause. Greenness of the stools is no positive proof of the bile being vitiated; almost all acids occasion a green precipitate on admixture with the biliary secretion; and it is probable that the green evacuations in children are almost always occasioned rather by a predominance of acid in the chyme, than by any altered condition of the bile itself.

With respect to the prognosis in cases of diarrhœa, that must be deduced from the effects which the disease appears to exert over the system; if the child be fretful, restless, and in pain; if the countenance be much altered and pinched, whilst the complaint is still persisting; if the breathing be uneasy, and the emaciation sudden

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* Burns, *Libri citati*, p. 576.

and progressive, with the skin hot and dry; the abdomen painful on pressure, and much thirst present; the symptoms must be considered unfavourable. Excessive loathing of food, or great voracity of appetite, are extremely dangerous.

The treatment of diarrhœa in the most violent cases, is, on the whole, by no means satisfactory: the variety in the nature of the causes, the exact condition of the intestine being so difficultly appreciable, no precise and definite rules can be laid down for its management—"alia noscendorum, alia curandorum morborum methodus, nec singulis omnia aptare possunt*."

Had we precise pathognomonic symptoms indicating whether the disease consisted in mere irritation occasioned by some acrid matter in the intestinal tube, or in inflammation of the mucous coat arising from suppressed perspiration or other cause, or to those two agents combined, we might be enabled to regulate our practice accordingly: unfortunately, as we have before stated, the precise nature of the disease is veiled from our knowledge; and we can consequently, in general, at-

* Fernelius.

tempt only to relieve the distressing symptoms as they occur. When the diarrhœa is combined with organic disease of the intestinal glands, or of the tube itself, it is of course more difficult of removal.

A moderate diarrhœa has, by many, been considered rather as a desideratum than otherwise; on the supposition, that it is an effort of nature to remove something offensive from the bowels*; but although in many instances it subsides without the supervention of any unpleasant symptoms, yet, in others, if neglected and suffered to run its own course, it frequently terminates in the more violent forms, or occasions inflammation of the mucous membrane, and intussusception or other fatal affection of the alimentary tube. It is always an indication that some irritation is existing in the bowels, and ought therefore to be attended to.

In the milder cases of diarrhœa, the treatment is extremely simple. Where the stools of

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* Comme les intestins sont les égouts habituels où la nature opère ses crises dans différentes maladies, il ne faut pas supprimer sur-le-champ cette décharge. GARDIEN, *Libri citati,* tome iv. p. 197.

the infant are of a light-green colour, and sour smell, the disease is generally dependent either upon improper quality or quantity of nourishment or weakened power of the child's digestion. The diet must, consequently, be regulated in the manner hereafter to be described; and those plans of treatment adopted which have been detailed in the Chapter on ACIDITY AND FLATULENCE. Under this practice, the disease will generally subside.

In the common cases of diarrhœa, where the constitution does not appear to be participating to any great degree, that is, where there is no great fever, nor symptoms of local phlegmasia, the most advisable plan of treatment is the exhibition of some mild purgative, as rhubarb and magnesia, castor oil, or rhubarb and calomel, according to the age of the patient, in order to remove any source of irritation which may subsist in the bowels. It has been before remarked, that, unfortunately, we have no pathognomonic symptoms by which the presence of inflammation of the tube can, in every case, be detected; and, consequently, this mode of practice, in some

measure empirical, becomes necessary ; as, should inflammation of the mucous membrane be present, those mild purgatives will not be likely to increase the affection.

Should the exhibition of purgatives not diminish the disease, but, on the contrary, the stools continue as frequent, whilst they are extremely offensive to the smell and unnatural in their appearance, they had better be repeated. Should their appearance and character improve under this treatment, but their frequency still persist, prepared chalk may be administered in suitable doses, with opiate friction over the abdomen, combined with occasional injections of thin starch and laudanum : but these are, in general, required in violent cases only, the milder commonly yielding to the use of the internal remedies before enumerated. Great benefit has also been occasionally found to accrue from the use of a mixture composed of twenty grains of toasted rhubarb, two drams of prepared chalk, a table-spoonful of brandy previously set fire to and allowed to burn as long as any spirit remains, and three table-spoonfuls of water ; the dose

being from one to two tea-spoonfuls every hour or two while awake*. Stimulating friction may also be employed, and the applicatian of a flannel bandage round the abdomen is generally serviceable.

Although inflammation of the mucous membrane of the intestines occasionally exists without the presence of any symptoms to indicate it, yet, at other times, it is more clearly to be detected: thus, when the stools are slimy, and there is much heat and thirst, the tongue white or sometimes red and dry, and the abdomen painful on pressure, the existence of phlegmasia is to be apprehended. Under these circumstances, active cathartics would be decidedly improper. By their irritating action they would be likely to augment the already increased action of the vessels, and, of consequence, to increase the diarrhœa, or so far occasion an augmentation of the peristaltic action of the intestines, as to endanger the production of intussusception—a consequence, we fear, of by no means uncommon occurrence. When these symptoms are present, the warm bath, emollient fomenta-

* Hamilton, *Libro citato.*

tions, drinks, and clysters, are of great benefit. By continental practitioners it has been recommended to apply leeches to the anus*, as the most certain means of removing the inflammation of the mucous coat ; but it does not appear probable that any advantage can be derived from their application there, which would not be equally obtained from the abstraction of blood from any portion of the abdomen, or, perhaps, even of the system ; whilst the choice of the part entails many considerable inconveniences.

For that extremely dangerous variety of the disease to which the term *watery gripes* has been applied, it is difficult to lay down a plan of treatment adapted to all cases. Whilst many practitioners strongly inculcate the necessity of repeated purging, on a presumption of the cause being referrible to the presence of irritating matter in some portion of the intestinal tube ; others, equally exclusive, imagine it to be owing to an inflammatory condition of the mucous tunic, and to require the use of sedative remedies only. Were the causes properly appreciated, both classes

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* GARDIEN, *Libri citati*, p. 199.

of practitioners would probably be found occasionally right, and both occasionally wrong. I have sometimes witnessed cases in which there has been every reason for supposing that some accumulation had taken place in the cæcum or small intestines; and where the increased peristaltic action, which had been the consequence, had produced irritation of the mucous coat, and augmented secretion of fluid by the exhalants. In such instances, of course, the affection could not be annihilated until after the removal of the offending matter. In other cases, purgatives have appeared to afford no relief, and the disease has rapidly yielded to the use of anodynes, and the testacea. Opiates should, however, be administered with the greatest caution. I have myself lately witnessed two cases, in one of which a dram of the syrup of poppies, and in another a powder containing a quarter of a grain of opium, proved fatal to young infants; and a case is referred to by the late Dr. Clarke, in which forty drops of Dalby's Carminative was attended with equally disastrous results*.

* Clarke, *Libro citato*, p. 33.

The opinions of those who have considered the disease to originate in retained fæces, have seemed to be confirmed by the circumstance of no solid matter being perceptible in the motions after its setting in. This is, however, no proof whatever of the correctness of their discrimination. In common cases of diarrhœa, whilst the secretion of fluid is moderate, solid feculent matter may be perceptible; but where the stools are frequent and the secretions immoderate, although in the aggregate the quantity evacuated may be equally great, it becomes so broken down and divided, as to present but little traces of it; so that its apparent paucity in any single evacuation, under such circumstances, ought rather, perhaps, to be considered as a guage of the extent of the disease, than as a proof of retention. If this idea be correct, and it has appeared to me to have been borne out by observation, the practitioner might go on exhibiting purgatives, under the delusive hope of inducing a discharge of retained fæces, until he occasioned a degree of inflammation of the mucous membrane, or an increase of the colliquative discharge, from the effects of which the patient might not subse-

quently recover. Many cases, I have but little hesitation in asserting, have owed their fatal termination to this practice. But it may be replied, that, under such treatment, the feculent matter has reappeared, and the patient's health immediately begun to be restored. Such reappearance, however, is no positive evidence of fecal retention having existed in those cases where the stools are extremely frequent, and dependant upon the causes which have been just exposed: the removal of such causes, howsoever induced, would give occasion to solid evacuations. But whether the disease originates in the retention of fæces or in increased action of the vessels of the inner membrane, the return of more consistent dejections is always a favourable indication.

The great difficulty, in the treatment of *watery gripes*, is to properly discriminate the cases in which purgatives are to be advised, from those in which they should be carefully abstained from. In general, where the child is suffering from copious, watery, stools, without there being much pyrexia, or pain of the abdomen on pressure, present, a dose of some brisk cathartic, as calomel joined with rhubarb, scammony, or

jalap, may be usefully administered; but should symptoms of abdominal inflammation be concomitant, the more gentle laxatives, as cold-drawn castor oil, rhubarb and magnesia, or syrup of senna, should be preferred, merely for the purpose of emptying the upper portions of the intestinal tube of any irritating matter which may be present. To fulfil a similar indication as regards the super-diaphragmatic portion of the digestive canal, an ipecacuanha emetic may be advisable. If, under this treatment, the stools become improved in appearance, and less frequent, the laxatives may be gradually decreased until they are finally abandoned altogether.

Should the symptoms not yield to the aperients, the frequency of the stools being much increased without their character being altered, whilst the powers are rapidly sinking, the warm bath, fomentations, and anodyne friction, may be occasionally used, and an opiate clyster be given repeatedly during the day in regulated doses; whilst the pulvis cretæ compositus, or any testaceous preparation, may be administered internally.

By these means, even although the stools are

unnatural, the inordinate secretion may be arrested; and gentle laxatives may subsequently carry off the offending matters.

Under the head of *Watery Gripes*, Professor Hamilton* has adduced a variety of diarrhœa which I have occasionally witnessed, and which is not less fatal than the disease just treated of; viz. the discharge of white, clay-coloured, stools, as if powdered chalk had been mixed with them, having a most offensive smell, being passed in a great quantity relatively to the food taken in, and rapidly reducing the flesh and strength. The fact of their greater copiousness than that of the ingesta, and the rapid emaciation which supervenes, suggests an interesting physiological question. Whether these fecal matters may not be the product of some secretion from the mass of blood? The symptoms which occasionally present themselves in disease, especially in the variety of diarrhœa to which we are at present attending, would lead us to answer the question affirmatively. The presence of the meconium in the intestines of the fœtus, and the copious fæcal

* Hamilton, *Libri citati*, p. 66.

evacuations which are observed in some chronic diseases, where liquids only have been taken, lead to the same conclusion: and, moreover, if the kidneys have the power of secerning urine which is sometimes clear and at others turbid, and if the skin can exhale an impure state of perspiration, why may not the intestines secrete a feculent matter, which deposits specific fæces, and is evacuated solely, or mixed with the rest of the aliments?

Where diarrhœa is dependant upon, or complicated with, affections of other parts, it can only be palliated, whilst its cause continues in action. For this purpose, the testacea, opiate clysters, rhubarb and magnesia, &c. may be had recourse to.

Where the food passes unchanged through the bowels, it is generally dependant upon some disease of the mesenteric glands, or great debility of the chylopoietic organs—the food being hurried along without any time being allowed for the digestive process to take place. Hence it is extremely dangerous. The treatment must of course consist of those means which will stimulate the various parts of the intestinal tube;

as the aromatic confection, spiritus ammoniæ aromaticus, infusion of rhubarb, &c. &c. with opiate clysters, and properly regulated diet.

In chronic diarrhœa it is as difficult to lay down any fixed rules for the treatment as in the more acute varieties. Whilst some cases yield very satisfactorily to one species of treatment, others do equally well under another diametrically opposite. In the "*Atrophia ablactatorum*," or "*weaning brash*," Dr. Cheyne found the most successful mode of treatment to consist in the exhibition of calomel in small doses, morning and evening, or every night, for a week or ten days. After the third or fourth dose, a great alteration was generally perceptible in the colour of the alvine discharge, which became of a dark mahogany colour, and was generally more offensive. When this discharge took place, a favourable change in the disorder was produced. The latter remark I have not found to accord with the results of my own experience in similar cases. In many instances, calomel has certainly appeared to exert a favourable agency; but I do not consider the stools referred to as by any means critical; on the contrary, there can be little doubt but that,

in any disease, and even in a state of health, such evacuations may be produced by calomel, and that considerable mischief is frequently done, by those evacuations being considered morbid, and the very exciting cause being persevered in for the purpose of removing its own effects. The occasional exhibition of clysters of thin starch and laudanum; or the use of toasted rhubarb, with any spirituous aromatic; or of small doses of opiates, combined with the warm bath; warm clothing, especially the application of a flannel bandage round the abdomen; and a properly regulated diet presently to be described—will generally be found the most efficacious mode of cure.

In the variety of "*weaning brash*" to which the term "*maladie de Cruveilhier*" has been absurdly appropriated, the most efficacious plan of treatment was found to consist in the use of opium and warm bathing, conjoined with properly regulated milk diet. Opium M. Cruveilhier considers to be one of the best antiphlogistics, even at the commencement of the disease*.

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* De Salle, *Libri citati*, p. 253.

His mode of exhibiting it is in a solution composed of one grain of the extract of opium to two ounces of the syrup of gum arabic*. Of this solution, half an ounce is diluted with three ounces of water, and two teaspoonfuls *(cuillerée à café)* given every two hours. Where the stomach was affected, the opium was almost always rejected; but when the disease was more particularly seated in the intestines, it produced "the most marvellous and constant effects." An eighth of a grain of opium, given morning and evening, and, in some cases, every four or five hours, in a clyster of aniseed tea, jelly, or starch, sometimes speedily arrested the diarrhœa and produced inexpressible relief. Emetics and purgatives he earnestly proscribes †.

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* The *Syrupus de gummi Arabico* of the Parisian Pharmacopœia, is formed as follows:

℞ Gummi Arab. contus.,
Aquæ, āā ℔j.
Syrup. simplic., ℔iv.

In aquâ gummi solve, tum syrupum adjice, coque per minuta duo vel tria, spumam absume et cola.—*Conspectus des Pharmacopées de Dublin, d'Edimbourg, de Londres, et de Paris,* p. 227.

† "Il regarde comme la pratique la plus dangereuse l'emploi des émétiques, des purgatifs, et en général tout le traitement

As we have observed, in a former part of this chapter, that diarrhœa is most commonly induced by improper use of spoon meat, or by sudden change of diet, owing to weaning especially in an unfavourable season; it follows that great attention must be paid to those circumstances, as well as to the other exciting causes before mentioned. Children ought therefore at all times, but more particularly in the autumn, to be weaned gradually, and to be well accustomed to the food on which they are afterwards to be fed, before they are finally taken from the breast. When diarrhœa has once occurred, the diet should consist of weak beef tea, or chicken broth with rice, or boiled cows' milk with baked flour, plain animal jellies, broths, freed from their oily part, equal portions of water gruel and of cows' milk, light boiled eggs, &c. Arrow root is not so suitable; as it is apt to run off by the bowels, and, consequently, to augment the disease. If the child, however, has not been weaned, it may be advisable to change the nurse: or, when recently

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vanté par les *humoristes* contre les saburres des premières voies." De Salle, *Libri citati*, p. 255.

weaned, the breast milk may probably be restored with advantage. During the continuance of the disease, a nutritious diet is recommendable. For this purpose small quantities of white wine whey may be administered frequently; and, should the child refuse nourishment, clysters of beef tea, or of any bland and nutritious fluid, may be regularly exhibited until the appetite returns.

When diarrhœa has persisted for a great length of time, or when the system is much debilitated from any cause, the power of retaining the fæces is sometimes more or less lost. This unpleasant state does not, however, generally continue for any great length of time, but, as the child becomes older, disappears. The only treatment, if any at all be considered necessary, is to dash cold water upon the perinæum and nates daily; or, if the bowels be very loose, to administer the aqua calcis, or any other of the absorbents before mentioned.

A common effect of diarrhœa is the PROCIDENTIA ANI, or falling down of the rectum from relaxation, with a consequent spasmodic stricture of the sphincter. The *procidentia* is generally of but short duration, and is readily reduced by

pressure. Dr. Hamilton* considers that the best plan for accomplishing this object, is, to lay the child upon its face, to separate its thighs, and then to press together the nates. But, should these means fail, the fore finger, previously greased, must be introduced into the gut, in order to remove the stricture from the sphincter. This undoubtedly is a more safe and speedy method than the application of astringent substances to the protruded parts, which may irritate and inflame them.

Where the *procidentia* is kept up by diarrhœa, worms, &c. they must be removed by the means before recommended; and, whilst a tendency to protrusion remains, the bowels must be kept open by the mildest laxatives, or by clysters.

In order to prevent the continual protrusion of the bowel, when the child goes to stool, M. de Salle recommends that the edges of the anus should be supported by two fingers, until the fæces have been discharged. If the child is not sufficiently old or intelligent, the nurse must do this†. By way of prevention, also, all irritations of the bowels should be guarded against, and

* *Libri citati*, p. 114.

† De Salle, *Libri citati*, p. 288.

the nates be dipped twice a day in cold water. As the child grows older, the complaint generally subsides; but should it persist for a great length of time, or the portion which escapes be very considerable, astringent injections and fomentations may be had recourse to; such as a decoction of oak bark or solution of alum, singly or combined. Occasionally, owing to the protrusion having been suffered to remain down for a considerable time, and the sphincter contracting spasmodically around it, the prolapsed portion of intestine becomes swollen and inflamed: the swelling, however, is generally reduced with tolerable facility by the application first of cold lotions, composed of the liquor calcis, plumbi acetas, or zinci sulphas, and afterwards of the means before recommended. When young children have been for a long time subject to *procidentia ani*, it has been recommended that they should be made to sit upon a hard flat stool, or in a chair without arms, and so high that they cannot touch the ground with their feet. When they are so old, however, as to be able to walk about, the T bandage, supported by a bandage over the shoulders in the form of braces, may

be applied, with or without the aid of cold lotions, as may be considered advisable.

Should all the usual means fail in curing the *procidentia*, which is by no means a common occurrence, the operation recommended by M. Dupuytren will generally succeed in removing it. That distinguished surgeon, finding that the excision of piles in very old people commonly prevented the return of *procidentia* where the two diseases were co-existent, was induced to cut off more or less of the internal membrane of the rectum near the anus. This operation he performed in four cases by means of a hook and curved scissors ; but, as violent hemorrhage occurred in one of the cases and a copious and obstinate suppuration in another, he has, for many years, been in the habit of removing a certain number of the projecting folds of skin, which may be seen converging from around, to the margin of, the anus, by means of a pair of ligature forceps, which are flattened at one end, and scissors curved on the flat side. These folds he lays hold of at an inch and a half from the anus, and cuts them off in the direction of, and as near to, the anus as possible. In a woman, who, for ten

years, had laboured under a permanent *prolapsus* of an oval form when she was in the erect posture, and of nearly ten inches in one diameter and seven in the other, which prevented her from walking, and continually discharged a mucous and bloody matter, five or six of the projecting folds were removed from without inwards, without difficulty or hemorrhage. The patient, who, prior to the operation, had had more than twenty stools daily, now went six days without one ; on the seventh, however, she had a copious evacuation, but the *prolapsus* did not recur. Ten or twelve other individuals have been cured by M. Dupuytren with equal facility. The difference between the two operations is very considerable. In the first, the mucous membrane is cut away ; whilst in the second, the folds of the skin at the margin of the anus alone are removed. Should an artery be opened, M. Dupuytren recommends the application of the actual cautery. He only uses simple dressings, and in twelve or fourteen days the wound generally heals, and the patient is cured.*

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* *Journal Universel des Sciences Médicales,* Octobre 1822.

Although *procidentia ani*, arising from relaxation of the rectum, is of but little consequence, it has been occasionally confounded with *procidentia* originating in a disease of a much more formidable character. I allude to that protrusion of bowel which has sometimes been witnessed in extensive cases of intussusception. In one detailed by Mr. Langstaff, and to which a reference will be found in the Chapter on INTUSSUSCEPTION, the ileum, cæcum, and colon, were found in the sigmoid flexure of the last intestine, and, during the violent efforts at stool, the contained intestine was protruded to some distance from the rectum. Examples of a similar nature have also been related by other writers.

Those cases are to be distinguished from *procidentia* originating in relaxation of the mucous membrane of the rectum, by their usually greater length, as well as by the possibility of carrying the index finger very high up in the cylindrical groove situated between the invaginated portion and the rectum: whilst in common *procidentia ani*, the finger is arrested by a sort of *cul-de-sac* at the part where the relaxed inter-

nal membrane is detached from the muscular tunic*.

Where the *procidentia* is owing to intussusception, but little, it is to be feared, can be done: it is, under such circumstances, accompanied with those symptoms which are enumerated under that head, and, when present, should always induce us to give an unfavourable prognosis to the friends: by which means, as Mr. Langstaff has correctly observed, we may be exonerated from blame on the occurrence of a fatal termination.

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* *Nosographie Chirurgicaæ,* par M. le Chevalier Richerand, édition 4ème. vol. iii. p. 445.

CHAPTER V.

OF VOMITING AND CHOLERA.

Except as a sympathetic affection, vomiting in children is but rarely met with: nothing is more common than to see those at the breast bring up the milk nearly in the state in which it had been taken; but this is never considered as a disease; the milk, or other food, seeming to come up without the child being sick or incommoded by it. So little indeed has this spontaneous puking been regarded, that it has become a common proverb, that, "a puking child is a thriving child*;" but, although it is an evidence that the nurse has a sufficient, and even a superabundant, supply of milk, where the puking occurs in children which are entirely fed on the breast milk, there seems to be some truth in the observation of

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* Underwood, *Libri citati*, vol. i. p. 100.

Rosen Von Rosenstein, that it can only be compared to the vomiting of a full-grown person, who eats and drinks in such quantities, that he is obliged to vomit several times in the day*. Simple, however, as is the indication which nature points out, it is but rarely attended to; and nurses go on applying the child to the breast, or giving it food, regardless of the admonitions which they receive. It is true, that, in the generality of cases, children do not suffer, owing to the facility with which they can throw off the superfluous nourishment; but in several cases there can be no question that bowel affections are induced without the cause being properly appreciated. The mother, who from the strength of her maternal feelings, applies the child to the breast whenever it cries, or is uneasy, is frequently the innocent cause of subsequent distress to her infant. Proper periods should be observed, and one portion of nourishment be suffered to be digested before another is received into the stomach; for, although an habitual vomiting of the nature above mentioned may, for the time, be of

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* Rosen Von Rosenstein, *Libri citati*, p. 8.

no consequence, yet it may lay the foundation for future derangements of the digestive organs.

This spontaneous and comparatively unimportant puking it is easy to distinguish from that which is more noxious. In the latter, the child is restless, and does not sleep well; is hot; the matter rejected by vomiting is thrown off with an effort, is glairy and mixed with bile, and generally firmly coagulated, if it have consisted of milk.

When means become necessary to allay the vomiting, its cause must be investigated and the remedies applied accordingly. In infants these causes generally are some change in the nurse's milk, or the presence of indigestible matter in the stomach. If the nurse has been sick or ill, or has undergone any violent emotion, or any change has occurred in her condition, some morbid alteration in the milk may be suspected; the child should, under these circumstances, be temporarily or wholly removed from the breast, as may be considered most advisable.

When vomiting is occasioned by any acrid substance in the stomach, the offending matter must be removed: should it consist in too great

acidity, which will be recognized by the sour smell of the breath, as well as of the evacuations, along with a green colour of the latter, magnesia, either alone or combined with rhubarb, or a few drops of the liquor potassæ subcarbonatis may be given, and the digestive organs subsequently strengthened by tonics, as has been mentioned in a former chapter. Sometimes, especially if the egesta be fetid and the milk firmly curdled like cheese, it may be necessary to clear the stomach by an emetic. A gentle dose of ipecacuanha is the best remedy for this purpose. By many, antimonial preparations have been recommended; but Professor Hamilton, of Edinburgh, asserts that he has frequently found them injurious to infants, from their sometimes causing a rapid sinking of the living powers. The crisis to this alarming state of prostration, according to that gentleman, is a discharge of thin mucus from the bowels. In many instances, he has seen the infant remain in a torpid, lifeless, state for twelve or fourteen hours after an ordinary dose of emetic tartar: and, as far as could be judged, nothing but the most powerful cordials and external stimulants could have prevented the fatal

event*. That antimonial emetics have been frequently, and indeed generally, administered without these disastrous effects being induced, he is ready to, and of course could not but, admit: the diversity of action was, however, incomprehensible to him, until he had perused Professor Orfila's work on Poisons, who has shewn that, where the stomach is full, no bad effects follow; but where empty, the tartarized antimony acts as a poison. I must own, that, although I have frequently given tartarized antimony to children, I have never witnessed these unpleasant effects, nor have I met with them in the practice of others. I place every confidence, however, in the accuracy of Professor Hamilton's discrimination; and as ipecacuanha is universally mild in its operation, there is no need of having recourse to a remedy of such potent action as the other. Where any quantity of indigestible matter is contained in the stomach, it is very probable that a portion may have passed into the bowels; and it is consequently always advisable to follow up the operation of the emetic by that of a cathartic. For

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* *Libri citati*, p. 54; and also CLARKE, *Libri citati*, p. 33.

this purpose, aloes, rhubarb, gentle doses of calomel, castor oil, or any of the common purgatives, may be exhibited.

Children of older growth are also liable to vomiting, from a surcharge or improper quality of food. They must be treated on similar principles; varying, of course, the strength of the remedies according to the age or constitution of the subject.

Where vomiting originates from sympathy with some other affection, the disease on which it is dependant must be attended to. Occasionally, however, the affection continues, after the sympathy or offending matter which produced it has been removed: or it appears to depend upon some irritability of the stomach. In those cases, tonics and cordials are the best remedies. An infusion of the cinchona, with orange peel and ginger, or of rhubarb, or the quininæ sulphas, in regulated doses, according to the age of the child, may be administered: or the spiritus ammoniæ aromaticus, or spiritus etheris nitrici, may be given. Sometimes a little wine whey settles the stomach. Should these fail, some stimulant or anodyne should be applied exter-

nally; as a flannel dipped in spirits and slightly dusted with black or white pepper*.

Occasionally CHOLERA is produced in children, from some of the same causes as induce vomiting; viz. from surcharge or improper kind of aliment, or from food of an indigestible nature in the stomach and bowels. In these cases, the stomach should be cleared by an emetic of ipecacuanha, and afterwards gentle doses of rhubarb and magnesia be recommended, along with opiate frictions and fomentations to the abdomen. The diet should also be composed of the mildest materials. The use of calomel has been much recommended; but it is only necessary in inveterate cases. When given, its administration should be carefully attended to, especially in children above three years of age, for fear that salivation should be excited; the diet be regular, and mild clysters or gentle laxatives be occasionally administered.

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* BURNS, *Lib. citat.* p. 569.

CHAPTER VI.

OF APHTHÆ.

This is an affection which is known to every one under the name of *Thrush*. It is but rarely of much consequence in this climate; but is nevertheless of such frequent occurrence under its milder forms, and causes so much uneasiness in the minds of the nurses, from a fear that it may degenerate into some more fatal variety, that it is worthy of careful consideration. Although, however, a comparatively mild disease in this country, it frequently, on the Continent, puts on a very malignant character, and has reigned epidemically, especially in the *Hôtel Dieu* and *Hôpital des Enfans trouvés* of Paris, and the hospitals of Aix and Perpignan, where it is designated under the terms *Muguet*, *Millet*, and *Blanchet*. The reason of this greater frequency of the malignant variety in the French hospitals, has been accounted for, and probably

with justice, from their receiving a much greater number of patients than ours, and from their apartments and beds, prior to some late reform, having been less cleanly, as well as the air more foul*.

The milder varieties of thrush are so well known and so little thought of, that they scarcely require a description. The eruption is slight, and resembling small pieces of curds adhering to the surface of the tongue, or within the lips and cheeks, and is rarely accompanied with fever or any unpleasant symptom. In a few days these sloughs fall off, and the parts underneath cicatrize. Where the disease, however, is not quite so discrete, the child is peevish, the mouth warmer, and the bowels more open than usual; the stools appearing green and possessing an acid or offensive smell. This complaint is most frequent in the first month, and has been observed by nurses to be commonly preceded by a state of torpor and drowsiness, to which they have generally applied the term of "sleeping for the thrush."

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* De Salle, *Lib. citat.* p. 209.

With respect to the worst variety of this complaint, it has been distinctly found to be accompanied by a fever of a contagious character; the eruption is preceded by a more considerable degree of drowsiness and *malaise;* whilst the feverish and other symptoms are occasionally mitigated as soon as it makes its appearance. The stomach and bowels are generally very considerably disordered, and the evacuations of a bad character, and so acrid that the anus is excoriated. The aphthæ, in these bad cases, occasionally spread into the trachea, and induce considerable difficulty of breathing, and sometimes suffocation; but more commonly they extend down the whole length of the intestinal tube, occasioning pain when pressure is exerted on the abdomen, with every symptom usually concomitant on an inflated state of the mucous membrane of the intestines. The child vomits its food immediately after it is taken; and there is a repeated discharge of watery fluid from the bowels, accompanied with considerable griping. After a short time the aphthæ become yellow and fall off; but frequently they are repeatedly renewed, and the child sinks under the abdo-

minal affection. The internal surface of the mouth becomes so sensible after the fall o the eschars, that the contact of nourishment occasions extreme pain, and the child cannot suck without the greatest difficulty. In these inconveniences the nurse is not spared; the contact of the diseased mouth occasioning a most painful ulceration of the nipple.

In the very worst species, the *aphtha gangrenosa*, or *muguet*, there is every symptom of malignant fever present. It is said to seldom attack children above two years of age, and rarely those above nine, except by infection. Its first appearance is marked by a very spongy state of the gums, and a remarkable tenderness of the inside of the cheeks and mouth. Soon after this, little aphthous sores, having a dark coloured surface, appear upon the gums, the inside of the lips and tongue, and occasionally upon the uvula and tonsils. As the disease proceeds, the cheeks swell slightly and are very soft to the touch. Frequently the skin which covers the lower jaw is of an extraordinary redness. Besides the aphthæ which appear upon the tongue, that part is usually much furred; and the teeth about the

edges of the gums are also covered with a blackish fur. The breath is extremely offensive; and at this period the disease is highly infectious, even to adults. In the progress of the complaint, the sub-maxillary glands become enlarged and slightly painful, and there is generally a more than ordinary flow of saliva*.

Three cases of the above nature I have lately witnessed in the same family. The symptoms which exhibited themselves in the individual first attacked, were so similar to those produced by mercury, that nothing could induce the parent to believe but that the child was under the influence of that medicine. The child had actually taken an ordinary dose of calomel; but the circumstance of two older children becoming, soon afterwards, attacked by a similar disease, to whom nc mercury had been administered, completely negatived such a supposition.

With respect to the prognosis in these affections, it must be judged of according to the state of the general as well as of the local symptoms. If there be frequent vomiting, with a discharge

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* De Salle, *Libri citati*, p. 224.

of watery stools, along with tenderness of the stomach and bowels on pressure being exercised; or if there be great anxiety, watchfulness, or somnolency, oppressed breathing, moaning, spasms, quick pulse, salivation, hiccup, or convulsions—the prognosis is unfavourable: as such symptoms indicate the presence of extreme irritability and depression. As for the local characters, if the eruption be dark coloured, it is unfavourable; and especially when the fauces have been of an ash colour from the commencement. A black colour is an index of gangrene*. If they be confluent, or not confined to the mouth and fauces, but evidently extend along the intestinal canal and trachea, or if accompanied with considerable fever, especially of a malignant character, or if they are continually renewed and the separation of the slough is not followed by a red and moist base, the prognosis is comparatively unfavourable.

An opposite appearance to the above, with contrary concomitant symptoms, of course induces a more agreeable prognosis.

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* GARDIEN, *Lib. citat.* vol. iv. p. 128.

With regard to the etiology of aphthæ, in the generality of cases, or in those accompanied with contagious fever, it would seem to depend upon a morbid state of the digestive functions, occasioned by improper quality of the nurse's milk, or of the food substituted for it; and hence the disease is generally, if not always, symptomatic of disorder of the digestive organs. Occasionally it may first appear upon the tongue: but, as Harris has very properly observed, it is then only an index of the existing derangement of the stomach and bowels *. From the very commencement, however, in the generality of cases, there is manifest disorder of those functions, the stools are generally of a bad aspect

* Ratio autem, quarè oris superficies adeò *aphthis* producendis favet, cùm interim cæteræ corporis partes ulcusculis nullis afficiuntur, hæc est: quoniam pellicula est eadem, quæ circumvestiens regionem oris per œsophagum in ventriculum ipsum continuâ serie ejusdem tunicæ exporrigitur ac descendit. Quamobrem halitus acres ex effervescentiâ corporis præternaturali circâ hypochondria contingente, tanquam ex aheno, per *oris* spiraculum sursùm feruntur atque membranæ illius partis labem suam facillimè infigunt. Ideòque gustus *linguæ* delicatulus sapores omnes promptissimè distinguit. Denique propter eandem rationem medici temperiem corporis prædominantem *ex conspectu linguæ* usitato valent dijudicare. —HARRIS, *Lib. citat.* p. 82.

and odour, and exhibit marks of imperfect digestion. It would seem that particular climates or states of weather predispose very considerably to this disease: thus it is said to be scarcely ever visible in warm climates, whilst in cold and moist districts, according to Boerhaave, Kételaer, and Van Swieten, it frequently reigns as an epidemic.

There can be little doubt that aphthæ are generally, if not universally, communicable to other children by actual contact of those parts which are lined with a prolongation of the cutis. Ulceration, in some cases, would seem to have been produced from sucking an excoriated nipple; and, on the other hand, as has been before remarked, nurses have been infected from the mouth of the child. These ulcerations are of course local, and require local treatment: a lotion, composed of dilute muriatic acid, will generally heal them.

The causes of the greater malignancy of the aphthæ in the French hospitals we have before mentioned. About the year 1744, Mr. Arrault, one of the administrators of the French hospitals, requested M. de la Peyronie to visit

the *Hôpital des Enfans trouvés*, the situation of which was then in a dark, narrow, place, where the infants were compelled to be crowded together. At this period the aphtha gangrenosa was reigning to such an extent as to carry off the greater part of the children. M. de la Peyronie immediately discovered, that the cause of the evil was in the crowded state of the hospital, and the foul air consequent on that circumstance, as well as its bad situation. From his representation, seconded by those of the administrators of the hospitals, the present *Hôpital des Enfans trouvés* was erected, in which the disease has never assumed the frightful character which it possessed within the walls of its precursor *.

As regards their pathology, aphthæ are found to be situated in the mucous membrane, lining the alimentary canal from the mouth to the anus, which is evidently in a state of inflammation; the intestines in some parts have also been found gangrenous; so that, as Gardien has very properly observed, in an interesting but elaborate

* *Mémoires de l'Académie Royale de Chirurgie*, vol. v. p. 271, Paris, 1819.

dissertation on this affection, from the precursory symptoms, and from the appearances observed on dissection, it is at its commencement an inflammatory affection, frequently complicated in hospitals with a fever of bad character, which renders it prone to degenerate into gangrene *. With respect to the precise portion of the mucous coat affected by aphthæ, pathologists are not yet by any means agreed †.

In the treatment of this disease, the chief attention must be directed to the constitutional derangement, of which the local is so frequently merely symptomatic.

In the mildest cases, where there is no evidence of gastric or intestinal disorder, the complaint requires but little treatment. It may be well, however, to exhibit small doses of magnesia, to correct any acidity there may be in the primæ viæ, and to expel it from the body.

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* GARDIEN.—*Libri citati,* p. 123.

† "Les aphthes sont-ils une affection du chorion muqueux? appartiennent-ils aux papilles? sont-ils une inflammation isolée de ces glandes, tandisque les catarrhes sont caracterisés par une inflammation générale d'une étendue assez considérable du système muqueux?"—BICHAT, *Anatomie Générale.*

With respect to local applications, Professor Hamilton strongly recommends that nothing active should be used, until the sloughs become of a yellow colour; until which time they should be allowed to run their natural course. A solution of borax, port wine, or vinegar and water, he asserts, will readily remove the aphthæ before this time; but a new crop very soon appears. As soon as they have become yellow, which he esteems a sign that the subjacent skin has come on, any of the solutions above mentioned may be had recourse to*. I cannot, however, accord with that gentleman in his observations on this point. If the disease, which is not, I believe, denied by any one, consists, at the commencement, of an inflammatory condition of the skin, that condition will be best removed by the early application of astringents, combined, of course, with internal means appropriate for the removal of its cause: and I have accordingly found the greatest advantage from the early application of these remedies. If we wait until the sloughs turn yellow, or, in

* *Libri citati*, p. 52.

other words, until the new skin has appeared, there is then no necessity whatever for their employment; as the disease has arrived at a natural crisis.

Should it not, however, be considered necessary to interfere, the white of an egg beaten up with three table-spoonfuls of water, or a little veal soup, or any demulcent, may be put frequently into the child's mouth.

In those cases where the aphthæ extend to the stomach and bowels, and are accompanied with fever and irritation, it may be well to clear the stomach by the administration of an emetic of ipecacuanha; after which, gentle laxatives, as manna, castor oil, magnesia, or rhubarb, may be given. Harris* and Underwood† trusted almost wholly to the use of testaceous powders, com-

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* "Certum est *aphthas* (quantum libet lactationem, aut qualemcunque comestionem impedire solent) *testaceis*, et lenissimis catharticis dicto modo intercalatis protinùs recessuras esse; neque video, cur pluribus artificiis ad finem attinendum nimis doctè uteremur, cùm pauciora medicamenta et simpliciora, tam tutissimos quàm præstantissimos effectus edere possint."—*Lib. citat.* p. 82.

† *Libri citati*, vol. i, p. 71.

bined with the administration of gentle laxatives, repeated as occasion required. Should the aphthæ turn livid, bark and port wine may be used as gargles; while the infant must be supported by white wine posset, or by sherry wine, added to cows' milk. The sulphate of quinine may be also administered in properly regulated doses.

In those cases of aphthæ which are attended with contagious fever, constituting the worst species of the disease, the great indications must be, as Professor Hamilton has very properly observed, to support the strength and to palliate the symptoms. For the fulfilment of the first indication, wine may be administered as above recommended, or any other cordial; whilst from a scruple to a dram of bark, united with a few ounces of water or thin starch, may be thrown into the rectum every three hours. For answering the second indication, some of the testacea may be exhibited, and the mouth be touched with the preparations which have been recommended above.

When the anus of the infant has become excoriated by the discharge from the bowels, it may be anointed two or three times a day with simple

ointment, or a tallow candle will answer the same purpose: and should the nurse's nipples become affected, they may be washed with a solution of borax, or of any astringent.

If the disease appears to have been caused by any bad quality of the nurse's milk, or by improper food, the nurse must be changed, or the diet altered. If the child have been fed on spoon-meat along with the breast, the food must be discontinued; or, if it have been wholly educated by hand, mild and emollient fluids, as rice-water, sugar and water, and milk mixed with one third of whey prepared without acid, may be given: but, where it is possible, it should be wholly confined to the breast milk*. At the hospital of Aix, the following formula for the preparation of a *crême de pain*, is highly extolled for the regimen of infants which are deprived of the breast, "et pour prevenir le muguet." "Take slices of wheaten bread, dry them in an oven, steep them

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* Dans les aphthes simples et discrets, le teton d'une bonne nourice est le meilleur remède: il peut guerir toutseul. "Dans les aphthes confluens, le teton d'une bonne nourice est le moyen le plus sûr de guerison, si l'enfant a la force de le prendre."—GARDIEN, *Libri citati*, p. 130.

afterwards in water for the space of six hours, press through a linen cloth, and boil with a sufficient quantity of water for eight hours, carefully stirring from time to time with a spoon, and adding warm water as it grows thick. Towards the end of the coction, add a small portion *(une pincée)* of aniseed and of sugar, in the proportion of a dram of aniseed and an ounce of sugar to a pound of bread, and pass the whole through a hair sieve. This crême easily keeps for twenty-four hours, if placed in a cold situation*."

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* Pinel, *Libri citat.* p. 385.

CHAPTER VII.

OF INFLAMMATION OF THE STOMACH.

Inflammation of the stomach is a disease which is either very uncommon in children, or is confounded with other states of disorder of the stomach and bowels. If we are, however, to credit the assertions and diagnosis of M. Saillant, it is a disease which is by no means infrequent in France, and is said to generally attack children of four or five years of age *.

The pathognomonic symptoms, as described by M. Saillant, would seem rather to indicate a state of violent spasmodic action of the stomach, than inflammation of that organ. They are stated to be great pain in the region of the stomach, sometimes recurring every quarter of an hour, and accompanied with violent contortions, and the application of the child's hand to

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* Underwood, *Libri citati*, p. 107.

the seat of the disease. M. Saillant at first supposed that these symptoms were owing to worms: but one child having died in a few days, the body was opened, and the presence of active inflammation of the stomach, and of a part of the intestinal canal, clearly demonstrated. No mention is made of vomiting as a concomitant symptom, although it is probable that, in almost every case where the stomach is inflamed, it will be present.

In gastritis, recourse must be had, as in every other dangerous internal inflammation, to bleeding, either generally or by leeches, according to the age of the patient. This should form the sheet anchor. After the bleeding, a blister may be applied; and fomentations, poultices, or the warm bath, and castor oil, or any demulcent laxative be administered. Mr. Burns recommends the hydrargyri submurias; but where there is reason to suspect inflammation of the stomach, the mildest laxatives are to be preferred. If we are to credit M. Saillant, the treatment of the gastritis which he witnessed was very simple and yet efficacious; it consisted principally in the administration of cooling and laxative reme-

dies at an early period, with the use of the juice of the lettuce by spoonfuls every hour; an idea which he acquired from Baglivi, who directed the juice of the sow-thistle in the hemitritæis, or semi-tertian fever, under symptoms analogous to those of gastritis. The circumstance of such mild means being usually efficacious, inclines us still more to question the accuracy of M. Saillant's diagnosis. That inflammation in the fatal cases had supervened, is unquestionable; but it is more than probable, both from the symptoms and treatment successfully employed, that the generality were of a spasmodic nature; cases which the juice of the lettuce, consisting principally of mucilaginous matter, with a portion of an opiate principle, would be likely to relieve.

There is another state of the stomach, of which, however, I have not myself seen any example, where it is found after death remarkably softened, and readily lacerable. This condition is sometimes confined to one part of the stomach, whilst in others it extends even to the small intestines; and more children than one of the same family have died of the disease. It is not attended with any other symptom than those

common to diseases of the bowels, such as purging and griping pains. It is, however, very early accompanied with coldness of the face and extremities, whilst the countenance is shrunk and anxious. It is said to affect the intestines oftener than the stomach. To this state of parts the term gangrenous or sphacelated might perhaps be correctly applied; and there can be but little difficulty in pronouncing it the result of previous inflammatory action. Pathological observation, and experiments made on living animals, shew that softening of the mucous coat may take place in a very short space of time, provided the inflammation be violent. Half an hour after a few grains of corrosive sublimate had been injected into the stomach of a dog, Mr. Brodie found the mucous coat remarkably softened: in this condition it is impossible to detach it in the form of membrane; it is semi-fluid, and the slightest friction with the handle of the scalpel reduces it into a sort of reddish pulp *.

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* ANDRAL, *Nouveau Journal de Médecine*, p. 202.

This state of the stomach has by some been considered as the effect of the action of the gastric juice subsequent to dissolution. Where the stomach, however, has been acted upon by that fluid, it appears thin, soft and transparent, and all distinction between the different tunics is obliterated. It exhibits the same appearance as if a part of the stomach had been steeped for some time in an acid, and looks very different from any change induced by disease*. Perforation also generally takes place in some part, which puts on the appearance as if it had been removed mechanically, instead of by a morbid process†.

As the disorganization of which we are treating is not indicated by any precise symptoms; and as we are consequently unaware of its existence, no direction can be laid down for its treatment. It is well, however, on all occasions,

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* Baillie's *Morbid Anatomy*, 4to. 1803, p. 65.

† Some interesting Observations on "*Ramollissement avec amincissement, et de la destruction de la membrane muqueuse de l'estomac,*" by M. Louis, are contained in the Number of the *Archives générales de Médecine* for May, 1824.

where symptoms of considerable gastric irritation are present, to carefully press upon the region of the stomach and intestines, and if pain be induced, to make use of those steps which are necessary in inflammation of those organs.

CHAPTER VIII.

OF INFLAMMATION OF THE INTESTINES.

Inflammation of the peritoneal coat in children is by no means an unusual occurrence. Its commencement is similar to that of colic, but the pain is more constant and continued: there is considerable vomiting, also, and pain upon pressure, with pyrexia and constipation. This disease either proves speedily fatal, or degenerates into a chronic state; the child remaining for a long time suffering under fever and increasing emaciation, accompanied with occasional attacks of pain in the abdomen. The bowels are usually confined; but when stools are procured, they are either slimy, mixed with blood, or, in some manner, unnatural in their appearance. These symptoms persevere, and at last the little sufferer sinks, worn out by the continued fever consequent on the existing organic lesion.

The pathological anatomy of the more violent cases of enteritis, generally consists in complete disorganization of the peritoneal, muscular, and even internal, tunics: the intestine being frequently dark coloured, and as easily lacerable as wetted blotting paper. In the more protracted cases, however, as well as in the more acute, coagulable lymph is thrown out on the external surface in considerable quantity, so as to unite the convolutions of the intestines together. All the coats, also, are very considerably thickened, and the liver occasionally participates in the inflammation.

The treatment in the violent cases of this affection is much the same as in gastritis. In some infants, of course, depletion cannot be carried far; but the warm bath, laxative clysters, and one or more leeches, or blistering, may be employed, according as may seem meet to the practitioner.

In older children, the complaint is occasionally induced by cold, or improper diet. In these, it must be attacked more vigorously. Blood may be drawn from the arm, or by means of leeches, according to the age and constitution of

the patient, and blisters, fomentations, and saline aperient medicines be administered.

When the complaint assumes a chronic form, and appears to be dependant on some scrofulous *vice*, nothing that is very satisfactory can be recommended. The bowels, however, may be regulated, small blisters be occasionally applied, and the strength supported. The regular administration of the hydrargyrum cum cretâ may also be inculcated ; and the unguentum potassæ hydriodatis, to the extent of half a hazel nut in magnitude, may be rubbed on the belly night and morning, or the tinctura iodinæ, in the dose of one or two drops, be given twice a day. The internal use of this remedy, however, requires more caution than the external ; as, when given to too great an extent, it seems to irritate and inflame the mucous lining of the bowels. For supporting the strength, we have a valuable remedy in the sulphate of quinine, which may be exhibited two or three times a day, united with a small quantity of any simple syrup.

Occasionally, in these cases, an abscess forms, which breaks, and discharges itself *per anum*. The fæces under such circumstances are very

offensive, and purulent matter is discharged. In these cases, magnesia has been found a useful laxative, and hyoscyamus, with oil of aniseed, of great benefit as an anodyne. If the appetite be not lost, although they may be very desparate cases, there is some hope of a cure being accomplished*.

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* Burns's *Midwifery*, third edition, p. 583.

CHAPTER IX.

OF INTUSSUSCEPTION.

Intussusception is by no means an uncommon appearance on the dissection of children, as well as of adults, who have died without any symptoms of intestinal disorder. In those cases, however, it cannot be considered as a disease; being, in all probability, occasioned by the irregular action of the intestinal tube immediately before the patient's dissolution*; as has been witnessed by experiments on living animals. Cases of this nature are no doubt meant by M. Louis, when he asserts that, out of three hundred children who died, either from worms or during dentition, at the *Hôpital La Salpêtrière*, in the major part there were two, three, four, and even more, volvuli, without any inflammation of the

* Baillie's *Morbid Anatomy*, 2d edit. p. 162.

parts, or any symptoms which led to a suspicion that these affections had been detrimental during life. Mr. Burns* also alludes to a case in which there were not fewer than forty-seven intussusceptions found in the same body. It is a matter of considerable doubt, however, whether these affections ought ever to be considered as morbid, or as the cause of death. They are widely different in their pathological anatomy from those cases which I consider as constituting the highly fatal disease of intussusception. Whilst those which have occurred a short time previous to, or at, the moment of dissolution, may be easily pulled out, the others are found agglutinated together, so that they can hardly be withdrawn, even after death, and are occasionally so firmly united by coagulable lymph, poured out on the peritoneal surfaces, that the intestines will tear sooner than the bond of union will separate.

Intussusception may be produced by a great variety of causes. Thus, any sudden spasm affecting the intestinal tube may throw one portion into another, and the intestine may not afterwards

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* *Libri citati*, p. 573.

recover its position; or it may be occasioned by diarrhœa, when accompanied by very considerable irritation or by worms. Acrid purgatives may also give rise to it, as has been proved by experiments made upon animals. By irritating the intestines of living frogs, Peyer observed that they contracted strongly in several parts, whilst in others they remained distended by the contents of the bowels. Into these distended portions the contracted became invaginated*.

More children than one in the same family have been observed to die of this disease.

As regards their seat, intussusceptions are far from being equally frequent in different portions of the intestinal canal. The ileum is by far the most common situation. In the cases published by Mr. Hunter, Mr. Home, Mr. Thomas Blizard, and Mr. Langstaff, the disease would appear to have commenced in this part; and in all the instances which I have witnessed the same cir-

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* "Hæ ita ampliatæ intra se receperunt constrictas intestini portiones, easque sinu suo absconditas aliquamdiù detinuerunt, donec fibris se denuò exporrigentibus, intestini pars una è latibulo alterius, velut è domunculo limax, pristinam in sedem rediret."

cumstance has been observable. Fabricius Hildanus and Bartholinus have seen the ileum received into the cæcum. Invaginations of the colon are very uncommon. Meckel asserts that he has seen the transverse and descending portions introduced into the sigmoid flexure; and there is reason to believe that the two cases related by Dr. Baillie* were examples of this nature. In the first case, a lady, about fifty years of age, after suffering much with violent pain of the stomach and bowels, more especially on the left side, accompanied with vomiting and constipation, about three weeks before her death, passed above a yard of intestine, which proved to be a portion of the colon. In this case the pain was more especially seated in the left side, and the evacuations, for many days, consisted merely of blood, and were very numerous. Of this symptom, which is a most important one in the diagnosis, we shall have occasion to treat presently. Of the other case Dr. Baillie has stated no further particulars than that the person lived two years

* *Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge,* vol. ii.

after discharging a portion of the gut, about six inches long, which also proved to be a portion of the colon. Bonetus has related the case of an individual in whom there was invagination of the rectum; and if we are to credit the story of a German author, he has witnessed the duodenum invaginated in the *ductus choledochus!* Generally, as may be imagined, it is the superior portion of intestine which is received into the inferior. There are some cases, however, on record, in which the contrary has happened. The length of the intussuscepted portion may vary from a few inches to upwards of two feet*.

It has been said that the diagnosis of this fatal disease is very obscure†; and some writers of considerable authority have asserted that it can never be known till after death‡. From the results of my own experience, however, and still more from the cases detailed by authors, I am induced to think that we may, with tolerable

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* *Clinique Médicale,* par G. ANDRAL, fils, p. 377.

† BURN's *Midwifery,* p. 574.

‡ "An introsusception can never be perfectly known till after death; but where there are violent affections of the bowels, attended with constipation, we have reason, from the

certainty, pronounce respecting the presence of this disease in violent cases of the progressive kind. Of those of the retrograde variety I can say nothing from my own experience; and from all that I can learn, they can constitute but a very small proportion of the whole mass. The suddenness of the attack, the ineffectual calls to void the fæces, the excessive pain and spasms, the discharge of mucus and generally of blood during the inordinate efforts at stool, form a congeries of symptoms which may induce us to pronounce with some confidence on the nature of the disease. And even should we err, and consider the case to be intussusception where it arose from any other cause, the mistake would be less pernicious than if we should treat the case as a common bowel affection, and thus add in a manifold degree to the extent of the organic lesion.

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cases which have been examined in the dead body, to suppose that this disease may be the cause of them: there are, however, so many other diseases which produce the same symptoms, that nothing can be ascertained."—HUNTER, in *Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge*, vol. i. p. 112. See also RICHERAND'S *Nosographie Chirurgicale*, tom. viii. p. 431. quatrième édit.

In no disease of childhood is it of greater importance to be careful in the diagnosis than in this. Any thing which would augment the peristaltic action of the intestines, so desirable in several of the diseases of early life, must inevitably, in this affection, induce a greater descent of the invaginated portion, or add to the existing inflammatory action going on at the peritoneal surface, and gluing those surfaces together.

Where the invagination has proceeded to any considerable extent, or where the small intestines, with the ileum and cæcum, have passed down into the sigmoid flexure of the colon, as in those cases related by Mr. Blizard*, Mr. Langstaff†, Mr. Hunter‡, and others, the seat of the disease was manifested by a hard tumour on the left side of the abdomen. This circumstance, with the impossibility of throwing up more than a very small quantity of fluid, which was strongly marked in Mr. Langstaff's case, along with the

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* *Medico-Chirurgical Transactions,* vol. i. p. 169.

† *Edinburgh Medical and Surgical Journal,* vol. iii. p. 262.

‡ *Libro citato.*

other symptoms, would still more strengthen our diagnosis.

With respect to the treatment of this formidable disease, but little can be said, and that little by no means satisfactory. A variety of means have been proposed; but none likely to be of service where the invagination has become united by adhesive inflammation. The only hope we have to indulge in, is that the intussuscepted portion may be separated by the efforts of nature, and that thus a cure may be obtained; the separated intestine being discharged *per anum*, and the raw edges uniting. Neither is this so forlorn a hope as might, by the unacquainted, be imagined. A number of cases of this nature are recorded, in addition to those mentioned by Dr. Baillie, to which we have above referred, where a considerable extent of intestine was discharged and the patient recovered. In one case mentioned in the ninth volume of *Duncan's Commentarie*, eighteen inches of small intestine were voided *per anum;* and other cases are communicated by authors, where twenty-three inches of colon and twenty-eight of small intestine have been respectively discharged. The most extensive por-

tion, however, of small intestine known to have been passed, so far as I am able to make out, has been lately communicated to the *Académie Royale de Médecine* of Paris by M.M. Bouniol and Rigal fils. The individual who was the subject of the case had laboured under violent dyspepsia, after which he was attacked with every symptom of internal strangulation ; as complete constipation, vomiting of fæcal matter, hiccup, and severe pain of the abdomen, with an elevated tumour, very sensible to the touch, in the right iliac region. At the expiration of twelve days, after violent pain in the bowels, thirty-two inches of small intestine and a portion of mesentery were evacuated *per anum*. From this time the patient rapidly improved, a painful sensation in the right iliac region being the only inconvenience remaining*.

As the above, then, is the only mode in which invagination of the intestines can be expected to terminate successfully when agglutination has once taken place, the indications consist in aiding as much as possible this natural effort: un-

* *Revue Médicale*, Août, 1823.

luckily, however, our therapeutical means here fail us. We are utterly unacquainted with the precise pathological condition necessary for this favourable separation ; and, by actual interference, are more likely to do harm than good. As considerable danger is, however, attendant on violent inflammation, it may be well to moderate it by bleeding, either generally or locally, by fomentations, or by the warm bath : large doses of opiates will also be likely to afford relief by diminishing the spasmodic action into which the intestinal tube is thrown by the obstruction in its calibre and consequent inflammation. Quicksilver has been recommended, but on what principle can scarcely be divined : if the invagination be progressive, the mercury must run through the invaginated portion ; and, if retrograde, the same thing would happen ; or, by getting between the intestine and the intussuscepted portion, it might aggravate the disease. The forcible injection of clysters has been recommeded by Dr. Monro ; and others have suggested the introduction of long bougies and of pieces of whalebone within the anus, for the purpose of pushing back the intussuscepted portion : the first of

these has been found to be perfectly futile, and the latter, for reasons which will suggest themselves to the mind of every one, is completely inadmissible.

Mr. Hunter, from theory, was induced to recommend emetics in cases of *progressive* intussusception, for the purpose of inverting the peristaltic action of the bowels; an object which is, however, fully answered by the effects of the disease itself, violent vomiting being one of its universal concomitants. Were any advantage consequently derivable from such means, the disease would be likely to find a remedy in one of its own effects; but this is not the case: there is no probability, therefore, that artificial emetics would act more beneficially. The only period at which there could be a chance of their succeeding, would be prior to agglutination, or before the urgent symptoms had set in; a period, at which the practitioner is rarely called, or, if called, does not suspect the disease, owing to the absence of the more prominent symptoms.

According to the same theory, in cases of the *retrograde* kind, the indication to be pursued, would be to augment by cathartics the peristaltic

motion of the intestines. We have, however, no diagnostic symptom which discriminates the two varieties from each other.

By some authors, the question of whether it might not be advantageous to perform gastrotomy for the purpose of disentangling the invaginated portion of the bowel, has been gravely agitated*. It is scarcely necessary to say, that the danger arising from this operation, and the utter impracticability, in several cases, of separating the agglutinated portion without producing, if possible, a more speedily fatal lesion, renders the operation utterly inadmissible.

With the mitigants, therefore, which have been previously recommended, these dreadful cases had better be left wholly to nature; under whose management they will be more likely to arrive at a successful termination than if they should be officiously interfered with.

* Barbette—see Friend's *History of Medicine;* and Hevin in the *Mémoires de l'Académie Royale de Chirurgie,* vol. v. 8vo. edition.

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EXPLANATION OF THE PLATE.

The Plate contains a representation of the most common varieties of *Entozoa* which infest the human intestines; the *Strongylus gigas* and *Distoma hepaticum* being but rarely met with.

Fig. 1.—The male *Tricocephalus dispar* or Long Thread Worm, of about the natural size.

Fig. 2.—The *Oxyuris vermicularis*, Maw or Thread Worm, of about the natural size.

Fig. 3.—The female *Ascaris lumbricoides* or Long Round Worm, much reduced.

Fig. 4.—The male *Ascaris lumbricoides*, also much reduced.

Fig. 5.—The *Bothriocephalus latus* or Broad Tape Worm. This worm does not always terminate as represented in the Plate, but occasionally ends in two processes; one of which is longer that the other. The head is similar to that of the *Tænia solium*, but is more filiform.

Fig. 6.—A portion of the *Tænia solium* or Long Tape Worm.

Fig. 7.—The head of a *Tænia solium*, twenty feet in length, of the natural size.

Fig. 8.—The last joints of the *Tænia solium*, shewing its mode of termination.